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MEDICAL CONDITIONS IN THE SOUTH PACIFIC.

By S. M. LAMBERT, M.D.,
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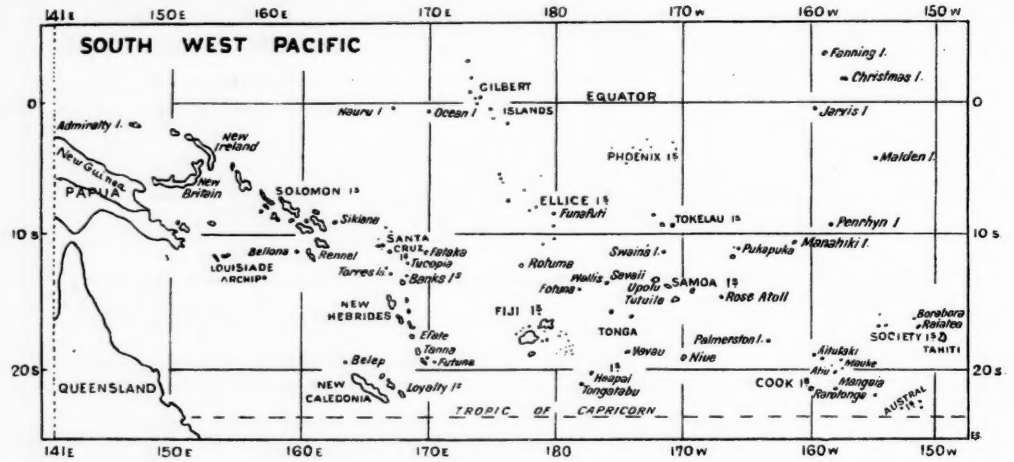
Introduction.

IN this paper the South Pacific is considered to lie south of the Equator, east of the 141st meridian which marks the western boundary of the Australian Territory of Papua. I have studied conditions in most of the larger islands where white men have gone and in most of the smaller islands in this area except in New Caledonia, the Marquesas and the Society Islands.

Geographically these islands are divided into Melanesia or the Black Islands, Polynesia or the Many Islands and Micronesia or the Tiny Islands. Melanesia consists of New Guinea east of the 141st meridian of east longitude, the Bismarck Archipelago, the Solomons, the New Hebrides, New Caledonia and Fiji. It is considered that Melanesians are a cross between the autochthone negroid and later invading stocks, of a much lighter colour. In New Guinea and other islands pure negroid still predominates in certain regions. Polynesia includes Tonga, Samoa, the Ellice, Union, Cook, Marquesas, Society and Paumotus islands. The only Micronesians in this area are the Gilbertese and possibly the Niueans. Politically the southern half of New Guinea east of 141st meridian, with its contiguous islands forms the Australian Territory of Papua; the northern half with its contiguous islands, the Bismarck Archipelago and part of the Solomon Islands, forms the Australian Territory of New Guinea, formerly a German possession; the remainder of the Solomons and the Santa Cruz group form the British Protectorate of the Solomons; the New Hebrides is a hybrid political horror called the Condominium under the control of the French and British; Fiji is a Crown Colony of the British; New Caledonia and the Loyalties are a French possession; Tonga is an island kingdom under British protectorate; the Gilbert and Ellice Islands are a British colony; Western Samoa and the Tokelau or Union Group are a New Zealand dependency, as are the Cook Islands; a portion of Samoa, Tutuila and the Manua Group and Swain's Island in the Tokelau Group are American; the Society Islands, the Paumotus and the Marquesas are French. Rotumah is an entity attached to Fiji; Niue is an entity attached to the Cook Island administration; Wallis and Futuna are twin French islands lying north-east of Fiji and not to be confused with Fotuna in the New Hebrides. The Governor of Fiji is Western Pacific High Commissioner for the Gilbert and Ellice Islands, the British Solomon Islands, the New Hebrides, Tonga, Christmas, Fanning, Pitcairn and the Phoenix Group. The Governor of New Caledonia is Western Pacific High Commissioner for France. The Polynesians



speak a language so similar that different groups separated by thousands of miles can converse with each other. Philologists say that the many languages of the Melanesians are dialects of the same root tongue that can be traced across Melanesia to India and on to Madagascar. The Melanesian is black skinned to light chocolate, seeming to get lighter skinned as he approaches Polynesia, where the native becomes light copper coloured to almost white. The Papuan is negroid in hair and many other features and these characteristics all seem to diminish as one goes east and south to the straight hair and almost aquiline feature of the pure Polynesian.

Fernander and Percy Smith have shown that great immigrations came out of the west into Samoa and the neighbouring groups by way of the large Melanesian Islands, leaving colonies of people of Polynesian speech or type settled on the fringes of Melanesia. Churchill, arguing from philological data, has supported the theory, but has left on

record the surmise that people of Polynesian type impinged on Samoa from the north. Thilenius disbelieves in the western migration track and without furnishing his reasons, decides on a northerly route. Rivers shows conclusively that races having a kava culture must have traversed Melanesia, ultimately to arrive in Polynesia. There can, therefore, be little doubt of the western stream. But the Gilbertese evidence roundly substantiates the American and German conjectures that there was also an important movement down the chain of Micronesian Islands.

At any rate, most of the evidence tends to show that the Pacific islands have been entered by races from the north and west, that is *viâ* Asia.

All animal, plant, bird and insect life thins out gradually as one travels from the north and west to the east and south through the islands.

It is doubtful if anyone will ever be able to say when these migrations took place. I believe the medical evidence tends to prove that the Polynesian, Melanesian and Micronesian have been residents of the Pacific a very long time.

When Europeans entered these islands, more than a century and a half ago, they were teeming with people; during the interval they have decreased so rapidly that common opinion has decreed their extinction, as so many other races have died out from contact with so-called superior races. The statistics available are meagre; even medical opinion is meagre on the subject, as few men have been able to touch more than a few districts in one colony, never visiting another. This paper is an attempt to summarize the present situation as I see it from the bare data available, my personal experience and opinion.

The argument has been confined to native races alone and the questions of the Indian in Fiji, the Chinaman in most groups and the European in all groups have been ignored except in their relation to the native.

Medical Education.

The medical care of natives is the most difficult part of the task of their conservation. It is possible by quarantine to keep out most diseases; it is possible by concentration on one endemic disease to bring it under control; but to care for epidemics that do enter in spite of quarantine as well as to care for current sicknesses is difficult with limited finances in scattered island groups with large populations. One can get qualified men to run hospitals and care for people at central points. But white men cannot and will not endure for long the hardships entailed by caring for natives under primitive conditions. In addition, if one gets such men, they are handicapped for years by ignorance of the native language; if they learn the language, few attempt to learn the customs and consequent mental processes of the native patient, whereby alone they could best serve them. On the other hand, while it is perfectly true that most native races have members mentally capable of qualifying in medicine, that would not solve the problem, for then there would be men educated to the point where they could be paid little less than a qualified European. They would also have little taste for bush life.

In Papua and New Guinea they attempt with some success to work a change with "small doctors," laymen who are taught simple medicine.

In Fiji they attempted to solve this problem fifty years ago by establishing in connexion with their Suva Hospital a native medical school. Bright boys are selected by competition in the three "R's." They are put in the hospital where they make the rounds of the wards with physicians, assist in surgery, do dressings and put up medicines. They receive regular courses of lectures by the physicians After three years, having passed their examinations successfully, they receive the degree of Native Medical Practitioner and are established with small hospitals throughout the colony under supervision of white medical officers. On the whole this plan has worked remarkably well.

Here, I believe, is the answer to many Pacific island medical problems. These men receive small salaries, they understand the native language, customs and the native mind. Some of these have been more successful in other groups.

Other island governments have tried to follow this plan, but they were comparatively unsuccessful as there is no other medical centre as large as Suva. As a result there has arisen in the past few years a general feeling in the British groups that this school ought to be expanded. This feeling was easily crystallized and there is now being completed in Suva in connexion with its fine War Memorial Hospital of a hundred beds the several buildings necessary to enlarge the old school of sixteen students to a new school of forty students to serve the seven South Pacific groups which have cooperated, Samoa, Fiji, Cook Islands, British Solomons, Gilbert and Ellice Islands, Tonga and possibly the New Hebrides. The course is for three years, but planned to be expanded to a four years' course later on. There will be one full-time medical pedagogue and a medical faculty of six part-time physicians. The courses will include lectures and dissection in anatomy, lectures and demonstrations in surgery, lectures and demonstrations in *materia medica*, therapeutics and medicine and lectures and demonstrations in physiology and chemistry, lectures in ophthalmology, lectures and demonstrations in obstetrics.

According to a quota based on population, the cooperating groups will send boys to Fiji to be educated and returned to them. The graduates of this school will gradually fill the medical blanks of the South Pacific and should cause a profound change in health conditions.

The school will be opened formally in November, 1928.

Vital Statistics.

The basis of progress in public health work is the proper collection and compilation of statistics,

relating to births, deaths and disease. Without such figures very little can be accomplished, as the results of an effort cannot be measured.

There are few accurate statistics of this nature in the Pacific.

An estimated 75% of illnesses resulting in death are unattended and diagnoses of such are made by lay persons.

The reasons for this are obvious. The groups are composed of many islands which lie scattered on the ocean. The area of the Western Pacific High Commission for instance is roughly 3,000,000 square miles. It is financially impossible to station sufficient European medical officers over such an area. Fiji, with a population of 170,000 on 250 populated islands, has eighteen European medical officers and forty-five native medical practitioners; Tonga, with possibly 100 populated islands and 29,000 population, has four medical officers and a few dispensers; New Hebrides has four European doctors and one native medical practitioner; the British Solomon Islands Protectorate with its many islands covering an area of 400 miles long and several hundred wide, has six qualified practitioners in the group; the territories of Papua and New Guinea have much the same relative equipment; the Cook Islands have two medical officers and a nurse; the Gilbert and Ellice Islands have two medical officers and one native medical practitioner for 30,000 natives; Samoa has six for a population of 38,000.

Obviously no accurate vital statistics can be kept. In Melanesia in addition government has only functioned at all over a period of thirty to forty years and there are in three groups immense regions as yet unexplored, where less than half the estimated population is under control.

Any statement of disease conditions must be a postulate, based on observation of groups of people, the evidence of years of experience or statistics of a small cross-section of the population.

Fiji has accurate records of births and deaths since 1891 and fairly accurate records of some other disease conditions since 1909.

Samoa has accurate figures on some diseases from 1923. In later sections these will be discussed.

In my opinion there exists in these islands a misconception of the function of the medical man. The medical problems of the islands are largely those of prevention. In practice the medical man is often paid by the Government a salary which is regarded merely as a retainer to be supplemented by private practice. Instead of centring on native welfare, he contents himself with the health of the few whites among whom he may be settled, and the prime object of his being, native welfare, is slighted or ignored.

Infant Mortality.

There is a greater number of deaths during the first year of life than during any other period. Among natives left to their own medical devices, infant mortality may be more than half of the births.

As general health measures are put in force this infant mortality diminishes, but is still very high, being estimated previous to 1922 at 200 to 300 per thousand deaths.

We have fairly reliable statistics for five years from the Fijians, Tongans and Samoans which indicate that infant mortality rates are improving.

TABLE I.—DEATHS OF INFANTS PER THOUSAND BIRTHS.

Year	Native Fijians.	Tongans.	Western Samoans.
1922	—	182	297
1923	167	136	200
1924	130	135	135
1925	172	295	186
1926	155	102	106
1927	158	—	—

It is interesting that an epidemic of whooping cough could raise the infant mortality in the three groups in 1925, showing how interdependent Pacific island groups are.

Tonga has advanced through improvement of general medicinal treatment, by massed attack on hookworm disease and yaws, by antityphoid injections on a large scale, by great improvement in latrine construction and in a lesser degree in her water supplies. Tonga also has developed a unique method of improving infant feeding. An approved infant food is given free by the Government. But each package is given only on prescription of a Government physician, which means that frequently the condition of each child is checked up in a rough manner. I believe this has resulted in the saving of many Tongan infants.

In 1925 Samoa took up seriously the question of infant welfare by securing two qualified women physicians to take over districts, to organize women's committees and to teach the women infant welfare. The results proved the worth of the work.

Keyes (Annual Report of the Department of Public Health of Western Samoa, 1927) had a district along the coast of Upolu twenty miles long containing twenty-four native villages, two mission establishments and four plantations. These points were visited twice a month, lectures given, women's village committees appointed, babies inspected and weighed and advice given to mothers.

During 1926 the birth rate in this district was 55·55 as compared to 52·6 for all western Samoa. The infant mortality was 90·5 as compared with 105·9 for all Samoa. The death rate was 16·19 as compared to 19·26 for the whole territory. Dr. Keyes was a part-time medical officer.

In 1928 Fiji is undertaking the experiment of child welfare in two provinces on the same lines. Probably the groups to the west and north-west have not reached a cultural level to make such an enterprise among them pay.

In the New Hebrides there has arisen a custom of sorts that is worthy of comment here. Dr. Nicholson, stationed at the Presbyterian Hospital on Tanna for many years, encouraged the raising of goats, primarily as a source of milk for the native children. Goats may now be found everywhere in

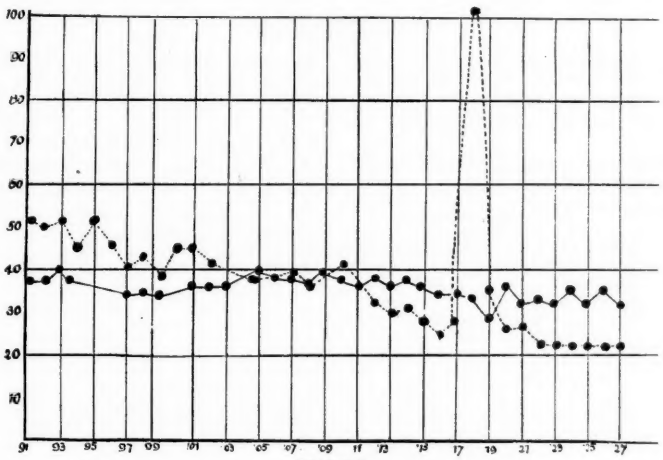
the island and the nannies have been the means of saving uncounted infant lives. The traders in general have not stocked infant feeding bottles which might have proved a source of danger in native hands, the general method being direct from the producer to the consumer, without the interference of the germ-engendering middleman. The flesh of the animals is a valuable food for the native as well.

Pacific Populations.

Popular opinion is that Pacific races are dying out. Actually there is little evidence of it. The eastern groups which met the first shock of western civilization, are slowly recovering and are on a fairly stable basis now, except for the Marquesas. Some others show a slow but steady gain and a divergence over a period of the birth and death lines in reassuring directions (see graphs).

The Melanesian groups west and north-west of Fiji are in a developmental period which the eastern groups occupied fifty years ago. But they have the advantage of modern knowledge of administration and of modern knowledge of preventive medicine and may profit by the mistakes of the eastern groups.

From this list I must exclude the natives of the New Hebrides, whose situation under the condominium affords little hope for their racial regeneration.



GRAPH I.
Fijian Births (———) and Deaths (- - - -).

The Fijian people have more difficulties to surmount in their adjustment to modern conditions than any other group and those in charge of their welfare have a more difficult task to face than any other Pacific administration.

Economic development demanded more labour than the natives could furnish. This labour came first from the other Pacific islands and then, commencing in 1881, 40,000 to 50,000 coolies were brought from India until in 1928 these number with their progeny over seventy thousand.

Thus the Fijian has had to fight the social effects of two totally different alien civilizations. I believe that if Fiji shows a healthy resistance under these circumstances, there is hope for the rest of Melanesia under equally good social and medical leadership.

Since 1891 statistics of births and deaths have been kept in Fiji and of its population which are trustworthy. Nowhere else, to my knowledge, is there so long a record of a native race.

The birth line maintains itself over the thirty-seven years in a steady manner; no modern country has maintained its birth rate so well over the same period. It shows little of the so-called apathy towards life attributed to the Fijian.

The death line shows what constructive medical work can do for a native people; this graph seems to show that populations in the Pacific have prospered as money has been invested in their medical needs. Plough money into the public health soil (for that is in essence the need of the Pacific native, medically) and the harvest is population.

Every upturned point in the death line is an epidemic.

In short, the steady expansion of medical effort, the application of each new truth in modern prevention and control of disease has enabled this poor colony to bring the death rate down from over fifty to just over twenty in thirty-seven years.

Under disease prevention must be reckoned the knowledge of hygiene that has been gradually disseminated throughout the population by education through various agencies. Probably no small part has been played by the expansion and improvement of the native medical practitioner system which I believe is original in Fiji.

In 1911 the death rate after a few years' struggle with the birth rate definitely fell below it, until the epochal influenzal epidemic of 1918.

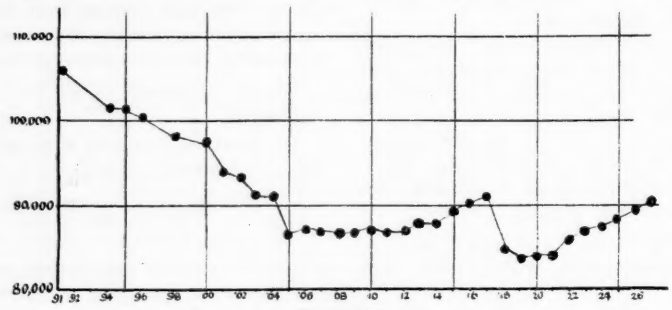
The next graph shows the progress of Fijian population during the same period.

The census is accurate and is taken every ten years. It is estimated from births and deaths each year. This has been found to be accurate for a calculated period. In 1911 the census varied only 200 from the estimation over ten years. In 1881 the population was 114,748.

Starting with 1891, the earliest year after which there are successive accurate records, the native Fijian population was 105,800. This population rapidly diminished over a period of fourteen years until a low point just under 87,000 was reached. During this period were several epidemics of dysentery, with endemic dysentery and whooping cough dragging at the population every year and the second disastrous entrance of measles into a non-immune population.

From the year 1905 to 1911 the population remained at one level and from 1911 rose definitely

to reach 91,000 in 1917. If the epidemic had not touched Fiji in 1918, it is estimated that the native population would have returned in 1928 to 1929 to the level of 1891. Since 1919 when the low point of 83,569 was touched, there has been a rapid, healthy increase in the number of Fijians until 1927 when the native population passed the 90,000 mark, its peak since 1905 with the exception of the one year, 1917. Mere figures of population do not tell the true story in Fiji any more than in any of the eastern groups. Some of the worst epidemics were caused by measles, whooping cough and dysentery. Now measles and whooping cough have done their worst to a non-immune population and are endemic as in other countries; dysentery is under better control each year.

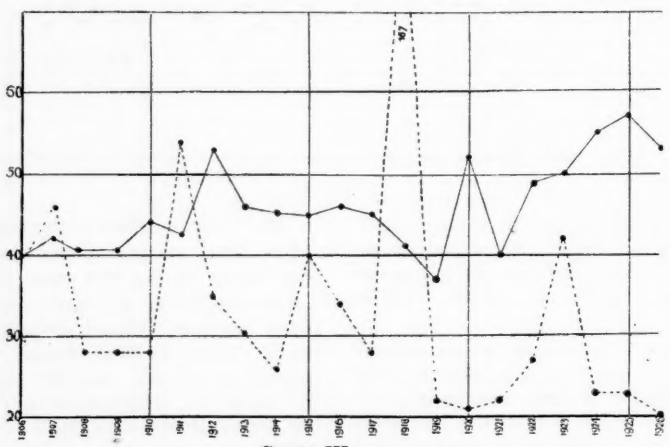


GRAPH II.
Fijian Population.

The future can discount many heavy losses of the past.

Statistics are available on western Samoan births and deaths since 1906.

If this graph be compared with the similar one on Fiji, two facts will be noted. First, the Samoan birth rate is uniformly much higher than the Fijian, evidently a racial characteristic. The second striking feature is that every distinct rise in the death rates from 1906 to date on the Fijian death line has a corresponding one on the Samoan line. The cause in each case was an epidemic of the same disease, which shows the interrelation of the islands in their disease problems.



GRAPH III.
Samoan Births (———) and Deaths (- - - -).

It cannot escape notice that these epidemic peaks in each instance are lower in Fiji, which implies one of two things, either the Samoans are more susceptible to these epidemics or the Fijians have been better protected. There is no difference between the resistance of Polynesians and Fijians in Fiji.

Attention is drawn to the divergence of the death rate and birth rate over the years 1923 to 1927. During this period there occurred in western Samoa one of the most brilliant illustrations of the possibilities of preventive medicine among native peoples, during which the birth rate was maintained at over fifty and the death rate was brought down to under twenty. This result was secured by a chief medical officer, who was a public health man, applying modern principles of preventive medicine among a fairly concentrated population.

Campaigns were concentrated on yaws which was almost wiped out in three years; mass treatments of hookworm had their effect; child welfare came in for attention; epidemics of dysentery and whooping cough were checked rapidly.

Yaws.

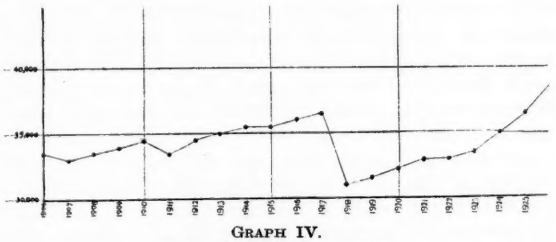
The distribution of yaws is peculiar. Castillani and Chalmers's map of yaws shows that it occurs in Central America, West Indies, West and East Africa, Madagascar, is rare in India, is seen in parts of China, is unknown in Japan and the central and western parts of Asia, is very common in the Malay Archipelago, Assam, Upper Burma, Siam, Java, Batavia and Ceylon and is known in the Philippines. South and east through New Guinea, the Solomons, New Hebrides, New Caledonia, Fiji, Tonga, Raratonga and Samoa it is possibly the commonest disease; it is unknown in New Zealand with its temperate climate. There is a definite history of it having entered the Gilbert Islands only in 1864. To the student of Polynesian migrations yaws might be significant in several ways; for instance, one wave of migration came down through the Gilbert Islands. Did this wave come from an area free of yaws east and north of Malaysia? Was Africa the home of yaws?

The disease is an old one in Fiji and Polynesia. Fijians have native names for five manifestations of the disease. Among Polynesians the name *tona* or a variant is among all the scattered groups, showing that it was a disease known to them before that ancient time when communications between the various sections of the Polynesian race ceased with their maritime decline. This was the disease

mentioned as syphilis by the earlier travellers and missionaries, as the example of the horrible depravity and immorality of the islander who in the prewhite era had a sound, workable code of social ethics which suited his environment, and which every individual practised.

In "Cook's Voyages" we find a most intelligent description of yaws and the first query I have seen as to its identity with syphilis. This was in connexion with his two visits to Tongatabu.

> They have another disease of a more mischievous consequence, which is also very frequent, and appears on every part of the body, in large broad ulcers, discharging a thin, clear pus, some of which had a very virulent appearance, particularly on the face. Some, however, appeared to be cured of it and others mending; but it was generally attended with the loss of the nose or a considerable part of it. It being certainly known and even acknowledged by themselves, that the natives were subject to this disease before they were visited by the English, it cannot be the effect of venereal contagion, notwithstanding the similarity of the symptoms; unless we adopt a supposition that the venereal disorder was not introduced here by our people in 1773. It certainly was amongst them at this time; for, soon after we arrived there, some of our people received infection; and Captain Cook had the mortification to learn from hence, that all the care he took in 1773 to prevent the communication of this dreadful disease had proved ineffectual. They do not



GRAPH IV.
Native Samoan Population.

> seem, however, to regard it much; and, as we did not see many instances of its destroying effects, perhaps the climate and the way of living of these people may abate its virulence.

In the Gilbert Islands where yaws entered only in 1864 on a vessel from Samoa, the natives single out two manifestations, one of which they call yaws and one syphilis. The one they call syphilis is the old healed scars of tertiary yaws ulcers. I examined great numbers of these so-called syphilitics and found no scars on the penis. I have never found a physician in the South Pacific who has seen a chancre or the scar of one on a Pacific Islander. Mr. Frater, missionary on Paama, New Hebrides, says he saw several on kanakas born in Queensland and returned to the New Hebrides which chancres had been acquired in Sydney on their passage through there. Since 1864 yaws has become universal in the Gilbert Islands. The South Pacific offers evidence of the immunity conferred by yaws against syphilis.

Yaws is so common among the peoples of the Pacific islands that its presence is accepted as a matter of course and its disastrous effects are too often overlooked. The problem of its eradication, until the recent introduction of arsenicals for treatment, has been too stupendous for consideration.

In 1896 a most notable report was published in Fiji, entitled: "Report of the Commission to Inquire into the Decrease of the Native Population," Government Printing Office, Suva, Fiji. Unfortunately this book is so long out of print that it is not easily accessible. It should be a textbook for anthropologists and others who have to handle native races, for the knowledge of them that it summarizes. The conclusions of these men of thirty years ago are so important and so modern that I quote them *verbatim*.

The Fijian Commission attached great importance to yaws as a factor tending to the deterioration of the race. Their conclusions were:

> 1. That yaws is a serious constitutional disease, the severity of which is lost sight of from the fact that it is almost universal among Fijians.
>
> 2. That yaws and its sequelæ are not alone responsible for many infant deaths, but they sap the vitality of the whole native race.
>
> 3. That from its resemblance to syphilis we think it possible that it has an ennervating effect on the child-bearing functions of native women.
>
> 4. That through familiarity with it the natives have no fear of it as a disease of childhood, that they dread its appearance in adults and that this has probably originated a universal belief that unless children acquire the disease, they will grow up weakly and dull.
>
> 5. That yaws in the first year of childhood is almost invariably fatal.
>
> 6. That the natives do nothing towards curing the disease except when it is passing off, their idea of treatment being practically to allow it to saturate the system of its subjects.
>
> 7. That the natives have no well defined idea of its inoculability, but imagine it to be a disease that "grows out of a child." That almost all native children suffer from the disease for a period varying from three months to two years or longer and that during that time no care is taken to cover or prevent the exposure of their sores which thus serve as founts of infection.
>
> 8. That the natives have no idea that the *sucuve, soki* or *lovo* and *kakaca* (diseases that affect the feet) of adult life are the sequelæ of yaws.

What has been said by this Commission of Fiji has been equally true of all the Pacific island groups. In Papua, New Guinea and the Bismarck Archipelago it was the commonest condition met with. From infancy to old age in 1920 and 1921 I saw this disease manifested in one of its stages, with mild to terrible lesions, on almost every person in most villages. In Papua, however, away from the coast it seemed that yaws had never obtained the hold that it had in all the coastal villages. In the Solomons and New Hebrides it is equally common today. In Fiji, Samoa, Tonga, the Gilbert and the Cook Islands the free use of modern organic arsenic compounds has modified the picture so that here yaws might soon be controlled to the point of eradication with no extreme expenditure. In fact the recent health administration of western Samoa has almost reached that point. Samoa has shown that if the confidence of the people be obtained by proper demonstration and education, yaws can be nearly eradicated by annual inspections of the whole population for three years and the giving of two injections yearly of a "Salvarsan" preparation to all patients with active disease.

The Commission to inquire into the decrease of native races laid no undue stress on the importance of yaws. The invariable result of mass treatments or intensive treatments for yaws has been the same in every group where I have seen it tried: invariably the birth rate has gone up and the death rate has gone down. Among the concentrated populations of the smaller Pacific groups, where there are credible statistics, this process is clearly marked out.

To my mind there is nothing more dramatic than the results of the organic arsenical compounds in yaws; almost immediately following an injection a large sloughing ulcer will clean up and heal over. This especially appeals to the natives of the South Pacific who require no urging at all to have the injection. They do not care so much for the intramuscular injections, but are always ready for the intravenous. At present in the Solomon groups an interesting experiment is being carried out on the island of Malaita. This large island with a population of from fifty thousand to one hundred thousand has never been well known and has been little penetrated. In October, 1927, the district officer and his assistant were killed together with some native police on a tax collecting tour of this island not far from the coast. The old method of treating such an occurrence would have been a punitive expedition in which innocent natives might have been slaughtered indiscriminately, while the perpetrators escaped punishment. In this case the men considered responsible were arrested with a great deal of effort and were given an impartial trial at the seat of government. But the interesting point is that within four months of the date of the massacre, the Government has thrown into Malaita two yaws and hookworm units to treat these respective diseases. The work has begun among the more civilized natives, the hope being that the news of this work will spread inland and that gradually these savage inland people who have resisted other measures for many years, may be pacified and civilized by the humble hypodermic and medicine measure.

Yaws has been well treated in Fiji, Tonga, western Samoa, American Samoa and the Cook group. In western Samoa it was on the verge of extinction until the recent political troubles. In Tonga gross lesions are rare; only in the remote districts of Fiji is yaws still prevalent to an appreciable extent. Organic arsenical preparations are commonly used, though the new bismuth preparations are being tried. The great objections to bismuth are first that natives object to intramuscular injections, secondly that bismuth must be given in several more injections than "Salvarsan" and as the cost of administration is four to five times the drug cost, there is no financial advantage in bismuth for mass treatments. "Arsphenamine" in large enough quantities can now be obtained for 90 cents for a 4·5 gramme tube, 60 cents for a 3·0 gramme tube, 20 cents for a 0·9 gramme tube.

Mackay made an interesting note on yaws and its transmission in the Tokelau or Union Group, population 1,029.

Yaws is not prevalent. Only sixty cases were seen in the group and these for the most part were "crab" yaws of the late secondary stage. One primary sore was seen and one mild secondary rash. Two "sabre" tibias, two cases of tenosynovitis of the wrist (of possible yaws origin) and ten tertiary ulcers were also seen. It is hard to understand why there should be so little yaws, when in Samoa a few years ago, before active Novarsenobillon treatment was inaugurated, nearly every second child was covered with a secondary rash. I could not ascertain from the Tokelau people any time when yaws had been prevalent. It seems as though yaws may be largely a fly-borne disease, for in the village islets of the Tokelaus hardly a fly is to be seen.

Venereal Diseases.

Venereal diseases are gonorrhœa and venereal granuloma. Syphilis is rare if not absent among the Pacific natives, protection seeming to be afforded by the universal prevalence of yaws. As yaws treatments eliminate this disease, syphilis may enter. The Indians in Fiji, the Chinese in several groups, the Tonkinese in the New Hebrides have syphilis and can spread it.

It is difficult to measure the incidence and spread of gonorrhœa.

In the Cook Islands I made a close inspection of the total adult male population of several islands. It was an easy matter among these simple people who were intelligent and wanted to help. The sick were few in number and the Cook islanders seemed to know that these should be quarantined socially until cured. They said their young men visiting Raratonga, the steamer port of call, brought back the disease.

In Samoa, Tonga, Fiji, the Gilbert Islands and the Ellice Islands it is not common and is probably freshly reimported at steamer ports of call and distributed from them. Among natives it is a mild disease, which is said to produce no stricture in the male nor salpingitis in the female.

Cilento says of northern Melanesia that venereal diseases represent a considerable problem, that treatment is unsatisfactory, that as intercourse between tribes increases the disease will spread and that all villages newly known to us have the disease. I spent two years, 1920 and 1921, in the Territory of Papua and in the Territory of New Guinea. This statement of Cilento is from the report of the International Health Conference held in Melbourne in 1926; it is most important, because in my opinion it represents an enormous spread in the six years from 1920. I helped to examine one thousand men engaged in labour in Rabaul in 1921 of whom 4% were infected with gonorrhœa. Outside of Rabaul it was common only in certain known areas. It was general in two large districts in Papua, but not common outside of these two areas. This disease, possibly better than any other, shows the results of breaking the ancient quarantine of intertribal enmity.

Gonorrhœa is said to be spreading in the New Hebrides. It has not become important in the Solomons.

Venereal granuloma occurs in Papua, New Guinea, the Solomon Islands and the New Hebrides.

It does not seem to have entered Polynesia. It is not widespread, but seems to occur extensively in certain areas.

Leprosy.

Early travellers in the Pacific spoke of the frequency of leprosy. Pentecost Island in the New Hebrides was called Lepers' Island on the early charts, the confusion arising from a lack of knowledge of ulcerative tertiary yaws. Cantlie is of the opinion that leprosy was introduced into the Pacific first in the Hawaiian Group about 1850. In 1892 Davies offered the first medical evidence of leprosy in Samoa where he found it in two Chinamen, an Hawaiian with a half-caste Samoan wife and a Samoan suspect. It must, however, have been present for some time before, as Pomare, surveying the Cook Islands in 1906, traced its entrance into Penrhyn to Siku, a native who lived in Samoa with an Hawaiian and returned in 1885. In 1886 a Kanaka, Nuka, developed leprosy in Manihiki contracted in Hawaii. These cases are recorded in detail to show how disease spreads in the islands. From those two cases over one hundred have developed since. Gould on Ocean Island in 1924 told me that he had five patients there, four of whom had served an indenture period in Tahiti and developed the disease seven to nine years after their return. Previously it was unknown.

We may surmise that leprosy is an introduced disease in the South Pacific. Its extent is only now becoming known in Polynesia. Very little is known of its extent in Melanesia. In the New Hebrides in 1925 Buxton and I saw a dozen leprosy patients incidentally. Leprosy is common and spreading in the New Hebrides. It is not so common in the Solomon Islands and less so in New Guinea. The history of its spread in Melanesia is unknown, but the recruiting of labour from Melanesia to widely separated island groups and countries was sufficient to account for its entrance.

In Polynesia good progress is being made in the control of this disease. In 1922 there came into operation a cooperative plan between New Zealand and the British Western Pacific High Commission and Fiji to concentrate their efforts on this problem. The conditions under which the lepers in these groups lived previously, were not good except in Fiji which has made admirable efforts for many years. Fiji had purchased the island of Makogai, with an area of twenty square miles, and established her lepers here under good medical supervision. The nursing is done by an indispensable order of Catholic sisters and is of the highest character.

Since 1922, New Zealand is adding her own lepers, those from her Cook Islands, Niue and Samoa; Tonga has added hers; there is one from American Samoa. At present there are 440 inmates, though when the cooperating island groups are fully surveyed, this number may be doubled. The inclination on the part of Fijians to conceal their sickness so that the curable early stages are not reached, is not so evident as formerly, as the people who have been cured, gradually return to their villages and report on the care taken of them and of the desirable living conditions at Makogai.

The Gilbert and Ellice Island colony elects to build its own leprosarium. The New Hebrides and the British Solomons cannot attack the leper problem, neither can the Territory of Papua nor the Territory of New Guinea. Here we have large areas untouched by government as yet. It will be a mighty problem for the future for these groups.

The generosity of Fiji in the cooperative effort on Makogai is far seeing. It should result in the eradication of leprosy from the groups concerned. South Pacific groups have strictly limited incomes and are incapable of much expansion. Leprosy among other problems is one that each group could handle only inadequately and at great expense to itself. By sharing capital cost and overhead, the fullest modern ideas of leper treatment are being carried out on Makogai on a scale that no one group could afford.

Small Pox.

George Turner, writing about 1840 "Nineteen Years in Polynesia" stated:

> On one occasion I got some vaccine lymph and by attending to it for two or three months, succeeded in getting every man, woman and child in the district vaccinated. My brother missionaries did the same. We have kept on vaccinating in subsequent years and to that as a means it is probably to be traced that we have never had small pox in the group. This has been a fearful scourge in some parts of the Pacific where the natives have not been vaccinated. I know of an instance where it laid a third of the population in the grave.

I have been unable to trace the island to which Turner referred. The Admiralty Islands were a focus of infection during the 'nineties; it has invaded Tahiti and the Marquesas more than once. Papua and New Guinea protect their ports by vaccination, extending their efforts as far as possible into the interior. Fiji for many years has vaccinated a few thousands each year. Otherwise the native populations are protected only by quarantine at ports of entry.

Most of the island groups get protection because they have only one or two steamer lines from well protected ports calling on them. Fiji has steamers from many island groups, from Sydney, Auckland, Vancouver, San Francisco, Great Britain, Malay Peninsula and India; that is, there are many threats of small pox.

In 1927 a ship *Ganges* arrived in Suva from India with 600 passengers of whom thirteen had virulent small pox. The control of this vessel and the subsequent landing of the immigrants in Fiji without a single case of small pox outside of quarantine, was a triumph for so small a colony as Fiji. Thereupon an organized vaccination campaign was begun in Fiji in 1927; by the end of 1928 it is planned to reach all in the colony who have not had two previous successful vaccinations.

Measles.

The earliest record I can find of measles in the Pacific is the epidemic in various islands of the New Hebrides in 1861, when among other islands

infected Aneityum lost 1,000 people, more than one-third of its population. In 1875 measles was brought to Fiji by a warship and is said to have caused the death of 25% of the population. Montague says in "The Report of the International Health Conference":

> After the great epidemic of measles in Fiji, anyone suffering from that disease for the next thirty years was quarantined. Then the disease broke out again in our country and some 2,000 or 3,000 of our population died. We then came to the conclusion that we had made a mistake in our quarantine regulation. We realized that after our first measles epidemic we should have allowed the disease into the country. The people would have then taken the disease naturally, as in other countries, and the second epidemic would not have hit so hard our population.

Measles is now endemic in Fiji, Samoa, Tonga, the Cook Islands and the New Hebrides.

With no protection such as vaccination affords against small pox, it will be impossible to keep measles out of the island groups where it has not entered.

Chicken Pox.

Chicken pox is endemic in most of the island groups, but is not malignant.

Diphtheria.

Diphtheria occurs in a mild form in many of the islands. It rarely becomes malignant. Infrequently it is recognized by post-diphtheritic paralysis.

Tuberculosis.

Tuberculosis is the immediate cause of more deaths than any other disease in the Pacific.

I have never been able to find a truly native name for any of its manifestations. This would tend to show that it is an imported disease. The earliest travellers and missionary writers reiterate the claims of the natives that it was introduced by the whites. The general lack of resistance of the natives which causes them to succumb to it so rapidly, shows that they have little acquired immunity for it gained by long contact.

The commonest form in which it appears is pulmonary tuberculosis; glandular tuberculosis and peritoneal tuberculosis are less common and bone infections are rare.

In making surveys of a few months in length over a group, even when examining large numbers of natives clinically, we find that the disease is not so apparent as the deaths from it would indicate. The explanation given for this is that the progress of the disease is so rapid that it is not evident to a passing observer. The causes of its spread are said to be lack of ventilation of native houses, a low standard of personal hygiene, the wearing of European clothes and dietary deficiency.

In the Melanesian islands natives will put on clothing which they do not usually remove until it rots away. They may go to bed with it wet with rain or sweat and never remove it. This is not so true of the more cleanly Polynesian nor do many Polynesians live in poorly ventilated houses. It would be difficult to design a house more suited to the climate than those of the Polynesian and Melanesian. The people live for most of the day out of doors in lands of sunshine, with a plentiful food supply of its kind in most groups.

Their hygienic habits are poor, but in the pre-white days they were much worse. For instance, the habit in many Polynesian groups and Fiji is to drink *kava*. The root was taken and thoroughly masticated, when it was spat into a common bowl, mixed with water, strained and passed about. This alone is sufficient evidence that in a *kava* drinking group, tuberculosis is new, for in the face of tuberculosis no people could have survived such a constant reinfection with germs as such a custom entails. With the entrance of the white man, more especially the white missionary, the custom has changed to the grinding of the root instead of the filthy mastication. Incidentally the Commissioner of Native Affairs for Fiji was horrified recently to learn that in some back districts the natives were beginning to chew their *kava* root again.

In the light of the recent discovery of the medical value of sunlight in tuberculous conditions the question arises in my mind if the greatest aid in resisting tuberculosis by the native has not been largely removed by the forcing of clothes upon him. If I had my way I would strip every Pacific Islander down to a scanty covering and keep the bodies of all of them exposed to the healing rays of the sun till they acquired some resistance to tuberculosis. Possibly clothing is the worst curse of western civilization to them.

In connexion with diet Cilento brings out a strong point referring to New Guinea:

> The recent work on vitamins led me to analyse for fourteen months all the diets of the territory, both the food issued by planters and also native staples. As a consequence, it was possible to say that even at its best the village diet of a Melanesian is bulky, innutritious, hard to digest, deficient in fat and in protein and often poor also in vitamins *A* and *C*. At its worst it is a famine ration. It may even be said (and I believe it applicable very generally in the Pacific) that a vast percentage of all natives living under native conditions in the Territory of New Guinea live in a state of chronic malnutrition. Accepting the above as established, it would be probable that the natives of the territory would be poorly developed, short in stature, inclined to the prominent abdomen and thin legs of malnutrition, lacking in energy and initiative (though possessed of occasional considerable endurance), particularly prone to intestinal diseases, eye diseases and various ulcerations and liable to succumb very readily to respiratory diseases rapidly acquired. This precisely mirrors the condition actually found.

Strong says with reference to Papua:

> Such cases, I am satisfied, are due to a deficiency in the fat soluble vitamin *A*. I rather suspect that it is mainly the lack of this vitamin which makes so many native races susceptible to serious tuberculosis infection.

Cilento found in New Guinea that the percentage of tuberculosis among natives increased rapidly with their period of indenture. The von Pirquet test revealed that 5% among new recruits were infected; after one year of indenture 42·8% and after five years 51·6% were infected; after ten years the frequency increased to between 63% and 70%. He attributed this to contact with non-

indigenous races. House boys more closely in association with Europeans unexpectedly show a much less involvement than plantation labourers who were much less in contact. He decided that the house boys were protected by their better diet, especially the fat element.

Personally, I think diet must play the chief rôle in the increase of tuberculosis on New Guinea plantations as labourers really come too little in contact with Europeans to account for these high figures. Diet probably plays a chief rôle in island tuberculosis. As natives associate with Europeans they learn to adore tinned fish and tinned meat and polished rice, biscuit, sugar and tea. In many places where fish abound the fishing has come to be done by Japs. or other races and the native buys from them or no fishing is done. Where he is on a diet which is on the vitamin border line, a little change in food sends him into the danger zone.

There is another point of diet and tuberculosis which may or may not be of importance. As government gets control of natives, the endeavour is always made to exclude the pig from the village. This means corraling them a distance from the town and it means carrying their food to them. This finally results in the gradual extinction of the pig. Families cannot afford or will not maintain separate pig stys; neither do they want to feed their neighbour's pigs and gradually their main source of fresh meat ceases and they have recourse more and more to tinned meat. As a sanitarian during my first years in the islands I was eager to corral the pig, but latterly I take the opposite view. I believe that the groups with plenty of pigs have better resistance to disease; that the pig breeding freely does more good than harm.

The native has not arrived at a cultural stage at which a modern tuberculosis campaign would serve a useful purpose. At present the best that can be done is to rid him of the debilitating diseases which lower his general resistance and make him an easier prey to tuberculosis.

Tuberculosis differs somewhat in amount in the different groups, but conditions between one group and another are comparable except with the Gilbert and Ellice Islands. Murray Young's observations on tuberculosis in his 1925-1926 medical and sanitary report for these groups show most striking and illuminating figures which my survey of 1924 corroborates. Tuberculous meningitis and peritonitis are occasionally seen in children and adults. Bone and joint disease are not common. Tuberculous cervical adenitis is almost universal in the Gilbert and Ellice Islands. Many thousands of radical operations have been done. Unless these are done very early, the result is hopeless. This is evidenced by the fact that in spite of the many thousands operated on, it is almost impossible to find a child with scars of the neck indicating an extensive operation. Tuberculosis is the cause of 30% of the deaths in these groups. The following table illustrates the average condition in these groups.

TABLE II.—MEDICAL EXAMINATION OF CHILDREN ON TARAWA.

Group.	Number.	Percentages.
Examined (1 to 16 years of age)	565	100·0
Requiring Operation	543	96·1
Requiring Operation on Adenoids and Tonsils	502	88·8
Requiring Operation on Diseased Glands	458	81·1
Requiring both Operations	442	70·0
Not requiring Operation and have not been operated	16	2·8

Young's experience is that conservative treatment is more than useless, as the delay always allows time for the disease to spread. He concludes that most of the tuberculous infections in these groups come from enlarged tonsils and adenoids and that the only hope lies in the wholesale removal of enlarged tonsils, adenoids and, where needed, glands. He intends to carry out these measures on a large scale. It will be interesting to note what result is obtained. There is no other group in the Pacific with a tuberculosis situation remotely resembling this. It may be shown that diet deficiency is an important factor in Gilbert and Ellice tuberculosis.

The percentage of tuberculosis in the Tokelau Group makes the situation in the Gilbert and Ellice Islands more anomalous. The Tokelau or Union Group lies east of the Gilbert and Ellice Islands, with natural environment almost exactly the same and inhabited by a people very closely related to the Ellice islanders. The dietary is similar to that of the Gilbertese, if anything being more limited. The population was 1,029. Mackay, who made a medical survey of the Tokelau Group for the Samoan Government in 1926, reports:

> This scourge, which is universal throughout the Pacific, does not seem to be unduly prevalent here. Two cases of advanced pulmonary phthisis were seen on Atafu, where there seems to be more tuberculosis than in the rest of the group. Eight cases of tuberculous glands in the neck were seen and two old cases of Pott's disease of the spine. Segregation of all cases of tuberculosis is carried out on Atafu, the patients being kept on one of the neighbouring islets. Throughout the group a change of air to the windward side of the atoll during convalescence after any illness seems to be a universal practice.

Cilento has been quoted on the Territory of New Guinea. Strong says of Papua:

> The spectre of tuberculosis has been visible in the background ever since I have been in the country and is advancing slightly. But it would seem that the resistance of the native to the infection is very considerable as long as he lives under his natural primitive conditions.

Tuberculosis is fairly common in the Solomons and in the New Hebrides. Montague with thirty years in Fiji says that during that time he has seen no increase in the condition.

Ritchie from Samoa says:

> Tuberculosis is said by many to be common in the islands, but our experience in Samoa has been that many cases which appeared clinically to be tuberculosis, were not found to be so in hospital. In cases which appeared to be tuberculous, it has been subsequently suspected that they were cases of broncho-spirochætosis.

There is reason to suspect that many of the so-called tuberculous in Fiji are really suffering from broncho-spirochætosis or broncho-mycosis.

In the Cook Islands I went over great groups of people, in some cases the total population of an island, and found very little tuberculosis.

My own experience is that tuberculosis in these groups is not relatively so important as it has been said to be and I do not believe it is spreading unduly. I except the special problem of the Gilbert and Ellice Islands from this conclusion.

Influenza.

There have been epidemics of influenza in these islands for over one hundred years. In 1918 the pandemic of influenza hit them like a thunderbolt, with losses too large to measure accurately. In most groups all forms of business and social life were disorganized. So many Europeans were ill that there were not enough strong left to care for the sick. Among the native races there was a panic and with no one to care for them they died like flies. Losses in various groups ran from 10% to 20% of the native races.

American Samoa escaped by rigid quarantine of the only steamship line touching there.

Australia kept it out of her borders for many months; when it finally entered it appeared to be so mild in nature as to be inconsequential. Then it was checked at one State border after another so that every town was well equipped to meet it when it arrived. I entered Australia during the first month of this battle and watched the daring and effective defensive put up by the Quarantine Service from month to month. It was a truly remarkable demonstration of what quarantine can do. The wisdom with which it was exercised, saved thousands of Australian lives and more millions in money, possibly, than the Quarantine Service has cost from its inception. A by-product of Australia's efficiency was that the Solomon Islands, the New Hebrides, New Caledonia and the two Australian territories of Papua and New Guinea escaped this pandemic.

Beri-Beri.

In 1884-1885, the first known epidemic of beri-beri in Fiji occurred among Japanese labour brought to work in the cane fields. As a result, no more Japanese came as labour to Fiji, which has meant one less racial complication in Fiji.

In many of the groups beri-beri has occurred among labourers on plantations, but the disease has now disappeared with modern balanced rations under Government supervision.

Eye Diseases.

In Samoa simple catarrhal conjunctivitis is common, but the most serious condition is the true Samoan conjunctivitis which is very infectious and spreads rapidly from village to village, beginning with itching, swelling and chemosis of the palpebral conjunctiva; within forty-eight hours there is a purulent discharge, associated with great pain and photophobia. The inflammation soon spreads down the naso-pharynx, having involved both eyes. In default of proper treatment, ulceration of the cornea follows and then, if the native treatment of scrubbing with coconut fibre is adopted, the destruction of the eyeball is a very probable result and is the reason of there being so many blind persons in Samoa. Clinically the condition resembles gonorrhœal ophthalmia, except that there is very little constitutional disturbance. An intracellular Gram-negative diplococcus is very constantly found in the discharge. It is very noticeable that the people in villages near bathing beaches or in those with adequate bathing facilities have few eye diseases. As soon as one leaves the beach or where there are few bathing facilities, eye diseases become much more prevalent.

Dawson in Tonga reports a large number of eye infections each year similar to the Samoan.

Fiji has a trachoma-like condition which is not uncommon.

Strong, of Papua, says:

> We have had epidemics of eye troubles leading to panophthalmitis and total destruction of the eye. Such cases are, I am satisfied, due to deficiency in the fat soluble vitamin *A*.

Eye conditions are not so prevalent in the other groups.

Ringworm.

Ringworm in the Pacific is generally called Tokelau ringworm. Mackay says in his survey of the Tokelau or Union Group:

> This is very prevalent, *Tinea imbricata*, *Tinea corporis tropicalis* and *Tinea alba* being the chief varieties. *Tinea imbricata* is commonly known as Tokelau ringworm. Apparently in the early days it was much more prevalent in these islands than it is today, hence the name Tokelau ringworm. This ringworm leads to such a striking disfigurement, or I might even say ornamentation, that on landing on these islands our attention is perhaps rather unduly attracted by it and we gather the impression that nearly everybody seems to suffer from it. This, however, is far from correct and the less conspicuous *Tinea corporis tropicalis* is much more prevalent. Forty-eight natives with *Tinea imbricata* were found in the group, as against one hundred and fifty-two with *Tinea corporis tropicalis*.

Tinea alba is very common, as in Samoa, where it is known as *Tane*. This form of ringworm, however, causes practically no irritation and the natives consequently do not seek treatment, although the white, floury patches it produces are very disfiguring on dark skin.

Ringworm is spread generally throughout the Pacific and as Mackay remarks, tradition has it that it spread from the Tokelau or Union Group. It is not a cause of morbidity, but is an annoyance to the possessor and a great disfigurement. The causative organisms have not been well studied.

In Fiji the sulphur box treatment is falling into disuse. A saturated solution of salicylic acid in strong tincture of iodine painted on the lesions has been found a successful treatment. Not more than one-third of the body is painted at one time.

Intestinal Parasites.

S. T. Darling, in "Geographical and Ethnological Distribution of Hookworm" (*Parasitology*, 1920, Volume XII, No. 3) and in "Comparative Helminthology as an Aid in the Solution of Ethnological Problems" (*The Journal of Tropical Medicine*, Volume V, September, 1925) produced evidence that the home of the *Necator americanus* was south of 20° of north latitude; that the home of the *Ancylostoma duodenale* was north of that line; that where either is found elsewhere, human migration has taken place.

All the hookworm work done in the South Pacific tends to confirm Darling's theory. In pure native stocks only necators are found except where there has been close association with Chinese or North Indians. For instance, in Papua among 2,133 worms classified as to species, there were only twenty-two ancylostomas; in New Guinea, among 21,354 worms there were only eighteen ancylostomas. Only pure necator infections have been shown from the Solomon Islands, Ellice Islands, Tonga, the Cook Islands and the New Hebrides. Fijians who have not come in contact with Indian immigrants, harbour only necator infections.

This would limit the origin and migrations of the Polynesians to south of 20° north latitude. The black races' habitat is south of 20° north latitude and they have necator infections. The ancylostoma is not in great enough numbers in any section of the South Pacific to require special treatment.

Fiji began hookworm work early, especially among her Indian immigrants who had settled in the moist, hot, sugar-growing areas and suffered universal cumulative infection. It was found that on the drier side of the islands these Indians gradually lost their intestinal parasites. Among the Fijians, too, the infection was found to vary with the rainfall. By mass treatments hookworm disease in Fiji is no longer an economic factor.

Throughout Melanesia including New Guinea, except in dry districts of 101 to 152 centimetres (40 to 60 inches) of rainfall, hookworm disease is almost universal and a widespread clinical entity. Cilento says:

> In Melanesia malaria and hookworm disease are so prevalent as to be less local diseases than a constant feature of environment. . . . Though the parasite is the less dangerous *Necator americanus*, treatment indicates that the measures taken have unexpectedly good results.

Carment says in the "Annual Medical and Sanitary Report for 1923" of the Solomon Islands:

> It would be interesting to know if the large decline in the indenture labour death rate was due to this drug (carbon tetrachloride for hookworm disease) as from all reports it has increased the efficiency of the labour. The Health Inspector of Lever Brothers' Plantations informs me that the sickness of their labour has fallen from 3·09 in 1921 to below unity for the past year. A trading company that has not used the drug, has experienced a heavy sick rate and death rate among their labour.

In the New Hebrides 94% of the native population were found infected with *Necator americanus*. In Samoa O'Connor showed that the Samoans had a general infection with hookworms which produced definite physical effects on them. He also believes the same of the Ellice Islands; which finding I was able to confirm in 1924. Tonga and the Cook Islands have a less degree of infection but it is clinically appreciable. Rotumah is one of the most heavily infected islands in the South Pacific from a clinical point of view.

The Ellice islanders I mentioned as being infected. Their neighbours, the Gilbertese, have no hookworm disease. Among 952 examined there were only 90 very light infections. Adults had 11% infection, children 5% infection. At first glance it is difficult to account for this variation in the rate and amount of infection in the Gilbert Islands from the Ellice Islands and other South Pacific groups. The rainfall is heavy on many of the islands; the soil is sandy; in the past there have been few latrines. When the matter is considered more carefully, it is found that the probable reason is the native habit of defæcation on the beach below high water mark. This habit has been acquired through the age-long dread of some enemy doing them to death by working magic on some of their bodily excretions. I found natives in central Papua who went into a stream to defæcate from the same fear of magic.

The following table shows the intestinal parasitic infections found during my hookworm surveys since 1918. Parasitic infections other than hookworm were incidental, but taken over the whole area they must be fairly comprehensive.

TABLE III.—INTESTINAL PARASITES.

Area.	Hookworm.	Ascaris.	Trichuris.	Strongyloides.	Oxyuris.	Hymenolepis.
	%	%	%	%	%	%
Papua	59	12	13	0·14	0·8	0·2
New Guinea	74	4	14	—	0·8	0·5
Solomon Islands ..	84	7	15	0·01	0·2	—
Fiji	93	—[1]	23	—	9·0	—
Gilbert Islands	9	—	21	—	—	—
Ellice Islands	52	—	47	—	—	—
Tonga	46	—[1]	51	—	5	—
New Hebrides	94	17	25	2·0	1	1·2
Cook Islands	70	21	34	—	1	—
Rotumah..	77	—	10	—	—	—

[1] See text.

The hookworm percentages of Papua, New Guinea and the Solomons are probably too low as compared with the others. These were estimated in plain smears; the number examined in the dry areas in Papua was disproportionately large. The whole column is almost pure necator infection, except Fiji where the East Indian populations have a low ancylostoma index.

A study of the ascaris column shows a low relative infection among Melanesians and Polynesians. In Papua most of the ascaris infection was confined to related people in the Delta Division. There was none in central Papua. In Fiji, among natives living out of contact with Indians ascaris is absent. In New Hebrides among Melanesians, except where

they have come into contact with foreigners, it is absent. In Tonga it is rare on Tongatabu, but common in the Vavau Group which has been more closely associated with the Samoans. Captain Erskine one hundred years ago reported *Lumbrici* as common among the Samoans. O'Connor found a 35% infection among Samoans in 1920.

Ascaris seems to me to be an infection absent from the negroid autochthones, added to certain areas by migration waves and by contact with whites and Chinese.

No ascaris infection was found among Gilbertese or Ellice islanders, but pig ascaris was found in the Ellices. None was found in Rotumah.

An interesting situation was found in Fiji of racial infection with regard to ascaris and trichuris, these infections are also affected by rainfall.

TABLE IV.

Rainfall in Inches.	Population.	Ascaris Infection.	Trichuris Infection.
		%	%
120	Indian	35	7
	Fijian	4	23
60–70	Indian and Fijian combined	2	4

Trichuris is an infection of Polynesians and Melanesians, though the Polynesians have a much higher rate. It shows no clinical signs in the Pacific.

Strongyloides stercoralis is not common in the Pacific. Campbell has recently demonstrated it in an Indian in Suva.

In Nausori my assistant found eggs resembling hookworm eggs, but larger, that resisted repeated hookworm treatments; they corresponded in dimension to *Trichostrongylus* as reported by Clayton Lane from India.

Hymenolepis nana is the only cestode found by us in Pacific natives, though we encountered a few *Tænia saginata* among East Indians in Fiji. The *Hymenolepis* is not a general infection, but occurred among related groups.

The salt flotation used by us in later years does not bring up trematodes. In Papua a fæcal specimen came from inland at Vailala, which contained many eggs of new trematode. Unfortunately we were unable to get the individual.

Cilento reports the finding of clonorchis from Rabaul. These, so far as I can determine, are the only trematodes encountered in the South Pacific.

In general the varieties of intestinal parasites in the South Pacific are few. The chief problem lies in the control of hookworm disease in all the islands but the Gilbert Islands and in the control of ascaris infection in Fiji and Samoa, where it causes much morbidity among Indian and Samoan children.

One can only conjecture the parasitic problems of the future, which may be brought to the Pacific by the influx of Asiatics.

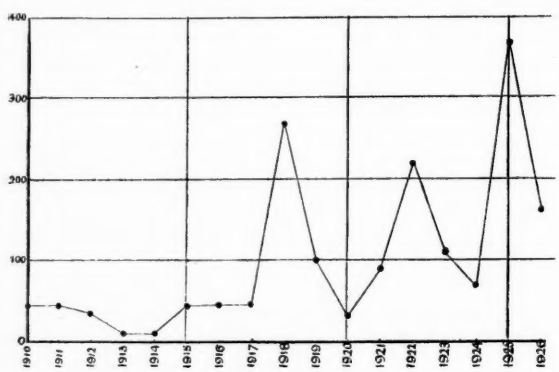
Enteric Fever.

Typhoid fever is spreading in the South Pacific islands. It is rare or of a mild form in Melanesia. It has been diagnosed in the laboratory in Rabaul by the Germans. But in Papua and New Guinea both typhoid and paratyphoid are uncommon and not severe. It is unknown in the Solomon, Gilbert and Ellice Islands and the New Hebrides and is rare in Samoa.

In Fiji, Tonga and the Cook Islands it appears to be endemic and epidemic on occasion. It was possibly introduced into Fiji by the indentured Indians and has been a great source of morbidity in the suburbs of Suva and in the Rewa district, a low-lying, wet, cane-growing area. In recent years in Fiji, measures of soil sanitation and improved water supplies in these endemic areas together with antityphoid injections have decreased greatly the amount of typhoid fever. Unfortunately it shows a tendency to spread to the Fijian, becomes scattered rather than local, which increases the difficulty of the problem.

In Tonga the use of antityphoid injections and greatly improved sanitation tend to control typhoid.

In the Cook Islands typhoid fever is a problem of recent introduction which will have to be handled by improved latrines and guarded water supplies. That this disease is spreading in Fiji is shown by the following graph of reported cases since 1910.



GRAPH V.
Colony of Fiji Typhoid Cases.

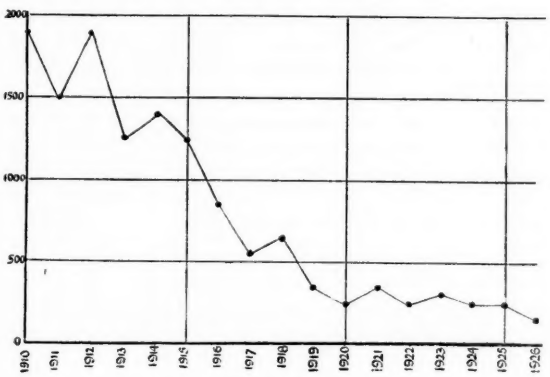
Dysentery.

The history of dysentery in the Pacific would make an interesting pamphlet. It was undoubtedly a disease introduced by western civilization. The visits of the early trading and missionary vessels were too often followed by outbreaks of dysentery which swept through an island group decimating it. It is now endemic in all the groups.

In the last 150 years there seems to have been built up among natives a certain resistance to this disease; in most groups some knowledge and appreciation of simple sanitation has spread among the natives; latrine systems have been installed in some groups; medical departments now bring aid to handle sporadic epidemics. Dysentery has ceased to be the dire problem of former times. Where there has been opportunity for a diagnosis the causative organism of epidemic dysentery has been shown to be of the Shiga type. Patients examined recently

in Suva, Fiji, have been found to harbour a Flexner type.

The following graph shows what has been done with dysentery in Fiji since 1910.



GRAPH VI.
Colony of Fiji Dysentery Cases.

Amœbic dysentery is not so common. New Caledonia and the New Hebrides (introduced from New Caledonia, says Madeleine) have much of it; Fiji has occasional cases; so has Samoa; so has Tonga; it has been diagnosed, but is very rare in New Guinea; it has not been reported from Papua, the Solomon Islands, the Gilbert Islands, Ellice Islands or the Cook Islands.

Sanitation.

Papuans, Melanesians and Micronesians take care that their bodily excretions cannot be obtained by an enemy, to be taken to a "magic" man, who might work their destruction by his incantations. When he lives near the beach, he uses it so that the first tide washes his excrement away. When removed from the beach he uses the bush and the pig acts as scavenger. The native knows that he must observe certain *tabus* or misfortune will overtake him. He believes, in Papua, that he must not urinate or defæcate near a garden or his crops will fail. He knows which stream to drink from and which to avoid. He is rarely at fault in his water supply. Experience tells him that the one brings bad luck, but the bad luck is really pollution.

In central New Britain where it was said that no whites had previously been, one of my European inspectors found eight villages with deep cesspits covered with a platform with a hole in the centre. In each village there was one for the men and one for the women. Captain Cook found the Maoris using cesspits in a day when in European capitals they were emptying night jars into the streets.

These are instances of a primitive sanitary conscience at work in the Pacific.

But with the entrance of western civilization the *tabu* system breaks down, the isolated white man having lower sanitary standards than the primitive native. Dysentery spreads as tribal barriers fall and with this quarantine removed, dysentery runs through the country like a flame through dry grass. Intestinal parasites reach a new equilibrium by interchange.

Samoa and Tonga are most forward of the groups in soil sanitation and water supplies.

Tonga has in hand a programme which is completed except in Niuafou and Niuatobutabu, two small distant islands; they have installed with each dwelling a cesspit latrine. The latrine has a concrete platform, a concrete riser, a cover and a flap of hardwood, with an iron ventilating pipe. It is fly-proof. Probably no other country in the world can say that it has a sanitary latrine for every dwelling. Tonga is going ahead also with a still greater problem. There are no streams and apart from shallow wells, water is caught from the roofs of European type buildings. Most of the country is flat so that there is no opportunity for water conservation except in tanks. The shallow wells have been the cause of a great spread of typhoid. As in other islands, it has been *tabu*, sacrilegious, to drink water caught on a church, of which there are from two to five in every village, forming the great catchment area. Most native houses have thatched roofs and are small. The present monarch, Queen Salote Tubou, has set the fashion which will now spread rapidly of using water caught on a church. By using all available roofs and also in some districts where it is physically possible, by sinking deep, protected wells, the shallow wells may be closed and the cause of spreading typhoid removed.

Samoa is in a happier situation regarding water supplies. Most villages are on the beach near a stream of pure water; in many under energetic leadership during 1923 to 1927, piped water supplies have been installed and in a few water-borne sewerage; others have over-the-sea latrines; in a few places the question of cesspits arises.

The administration of the Cook Islands with the recent entrance of typhoid has had to take up seriously the question of latrines and water supplies. This question is being handled gradually as funds permit.

Fiji is in a difficult situation with her Indians who have been permitted to huddle together in low swampy sections where the subsoil water often reaches the surface. The Indian is slowly and painfully being taught the principles of soil sanitation and the simple pit privy, the only one within his means, is gradually being raised in standard as his economic standard rises. Every Fijian village has a system of communal cesspits which is fairly satisfactory.

The Gilbertese and Ellice islanders use an over-the-sea latrine or the beach below high water, which is satisfactory soil sanitation for their situation. Here they have a well-rooted fear of using water caught on a church roof. As these are low sandy islands subject to drought, they have suffered greatly in consequence.

The Papuan, the New Guinea boy, the Solomon boy and the New Hebridean are not yet at a cultural level at which general education in sanitation can be effective. Papua, New Guinea and the Solo-

mon Islands have satisfactory plantation latrine systems, where thousands of natives are taught the meaning of soil pollution each year. As the villages become more civilized, the health departments endeavour to install a latrine system, but for a long time to come the pig in the village must be accounted the chief sanitary hope.

Some Anomalies of Mosquito Life in the Pacific.

The mosquito world would seem to bear evidence of a south and east migration of peoples in the Pacific. Mosquitoes found in Melanesia and Polynesia can be traced north to Formosa, Japan, China, Siam, Malay Peninsula and west through the Dutch East Indies and as far west as Africa.

An observation interesting to anthropologists is the manner in which the anophelines pinch out coming south and east after leaving New Guinea. New Guinea has a number of anophelines which have their origin in a broad fan-like source from eastern to southern Asia. But east and south of New Guinea these all diminish to the *Anopheles punctulatus*, another classified by Edwards as a variety of *punctulatus* and one of which only larvæ have been found once in New Britain. Passing to the Solomon Islands only *punctulatus* has been found; on to the New Herides, only the *punctulatus*. East of 170° east longitude which lies east of the Solomon Islands and New Hebrides and south of the New Hebrides, there have been found no species of anophelines. West and north of this line all the islands have anophelines except a few coral islands which are remote from land masses. Rennel Island in the Solomons, a fairly large island, only recently visited, which is inhabited by Polynesians who are primitive and of a quite pure Polynesian type, is said to have no malaria. As a matter of fact all the islets in this region which are free of malaria, have Polynesian inhabitants.

What was the reason in ancient times why anophelines were carried to the New Hebrides and the Solomon Islands and not on to Fiji and New Caledonia and the Loyalties which lie so close? In modern times for well over one hundred years boats of all descriptions have passed freely between the Solomon Islands and the New Hebrides and malaria-free Fiji and New Caledonia. In the old days the custom was to fill fresh water barrels from streams and springs near the beach for all vessels. This seems an almost certain way of transferring anopheline larvæ. With all the traffic that occurred, it seems strange that the seasoned *punctulatus* traveller has not been transferred to all the groups.

Vessels from the New Hebrides can enter the ports of Fiji only under the most strict regulations in recent years and the idea is to make Suva, the principal port of entry for Fiji, anopheline proof. But traffic from the malarious New Hebrides and Solomon Islands to the Loyalties and New Caledonia is unrestricted.

Another interesting mosquito is the *Aedes variegatus*, the carrier of non-periodic filariasis throughout Polynesia. In "Researches in Polynesia and Melanesia" Buxton says:

> *A. variegatus* var. *tongæ* Edwards is widely distributed in the Tonga group. It is known from nowhere else, except in Sikiana, an easterly outlier of the Solomons and its distribution seems anomalous in view of the known occurrence of other races of the species in Fiji and in the New Hebrides. The anomaly disappears when we remember that Tongans and other Polynesians were in the past great voyagers . . . It is therefore reasonable to suppose that the distribution of the mosquito, the eggs of which are resistant to drying, has been partly effected by canoes.

This conjecture is interesting to me as I remember on Sikiana in 1921 a whole evening was spent in listening to the story of how the Tongafiti in past generations had come to Sikiana and killed all the men and taken all the women.

The Gilbert Islands lie in a chain to the north of the Ellice group, the nearest island of one being two hundred miles separated from the first of the others. Buxton and O'Connor have worked in the Ellice Islands, occupied by a Polynesian people heavily infected with filariasis. Our mosquito index for the Gilbert Islands is not complete. Buxton's map in his "Researches in Polynesia and Melanesia" indicates that *Aedes variegatus* is probably absent from the Gilbert Islands. This conjecture is wrong for the present era, though there is some evidence that formerly *Aedes variegatus* could not have been present. Murray Young, Senior Medical Officer of the Gilbert and Ellice Islands, in his annual report for 1924-1925 says:

> There are no anophelines on these islands, but *Culex fatigans*, *Stegomyia argenteus* and *S. pseudoscutellaris* (*A. variegatus*) are everywhere found. Though *Stegomyia* are more numerous on the verandah, both *Stegomyia* and *Culex* seem to be equally abundant in the bush, even two or three miles distant from dwellings.

Until recent times there was no history of filarial fever and no elephantiasis in the Gilbert Islands. No survey for filariasis has been made, but in recent years it has apparently been creeping up through the group. This is evidenced by some natives with filarial fever and some with elephantiasis in the lower Gilbert Islands. This transplantation seems clearly to be the by-product of the entrance of western civilization in this group, probably because the *Aedes variegatus* has been newly imported there as well.

Grimble, the authority on the Gilbertese, says that one of the great tides of Pacific island invasion came down through the Gilbert and Ellice Islands to Nuclear Polynesia. Later we know that an invasion of Samoans returned northward through the Union Group and the Ellice Islands that was checked by the Gilbertese. This later invasion must have brought to the Union and Ellice Islands the *Aedes variegatus* and filariasis. *Culex fatigans* is a very recent addition. My reason for the conclusion is clear. It seems certain that coming from any place north of the Gilbert Islands the original invaders must have brought filaria with them. It seems equally certain that there was in the Gilbert Islands no mosquito vector of microfilaria, so that the disease died out in isolation among those who remained in the Gilbert Islands. The later Samoan

invasion from the south brought filaria and the *Aedes variegatus* to the Ellice Islands when they were conquered, but the mosquito and the disease were kept out of the Gilbert Islands by the resisting resident Gilbertese.

It ought to be possible at so early a date to trace the track of the entrance of filariasis into the Gilbert Islands, as it must be within the living generation. Also, as Young reports that the *Culex fatigans* and *Aedes variegatus* are so common in the Gilbert Islands, it ought to make a splendid field for the study of the relative ability of these to carry microfilaria and of the oneness or diversity of the organisms of periodic and non-periodic filariasis.

Filariasis.

There are two varieties of filariasis recognized in the South Pacific, nocturnal or periodic and non-periodic. No difference has been found morphologically between the two, neither in the microfilaria, in their parent worms nor in their clinical manifestations. The question of periodicity is said to be due to the habits of the insect vector.

Roughly, nocturnal filariasis is confined to Melanesia, where its occurrence has not been minutely studied as it is not a widespread clinical entity. The exception to this condition is found in the New Hebrides which is Melanesian, where filariasis is widespread and a source of great morbidity.

Non-periodic filariasis occurs in all the islands east of 170° of east longitude which corresponds with the region from which malaria is absent. The following table shows the percentages of the population affected in groups of which there are records.

TABLE V.—INCIDENCE OF FILARIASIS.

Area.	Percentage Frequency.	Authority.
Samoa	58	O'Connor
Ellice Islands	60	O'Connor
Tonga	37	Thorpe
New Hebrides	31	Buxton
Fiji	32	Bahr
Cook Islands	34	Lambert
Gilbert Islands	Becoming prevalent	Young
Rotumah	Widespread	Lambert

In all these except Rotumah, the Gilbert Islands and the New Hebrides the filariasis has been proved to be non-periodic. In Samoa, the Ellice Islands and Fiji it has been shown that *Aedes variegatus* is the principal if not the only vector. The Gilbert Islands probably became infected from the Ellice Islands. Rotumah and the Cook Islands probably have the same vector as those islands neighbouring which have the *Aedes variegatus*.

In the New Hebrides Buxton who had time only for a hasty and superficial study, deduced that filariasis was nocturnal and probably carried by the *Anopheles punctulatus*. He advised future research to study that insect first. A note from Gunn, medical missionary in the New Hebrides for many years, occurs in his "Gospel in Futuna," 1883, to the effect that "elephantiasis has been carried within the past few years from New Caledonia and Queensland into some islands (New Hebrides) and in Tanna the sufferers have been segregated." This supports Buxton's objection to his own conclusion that *Aedes punctulatus* was the probable carrier; "against this conclusion is the fact that in New Caledonia the filariasis is nocturnal and we have reason to believe that no species of anopheles exists there."

The labour loss that may occur through filariasis, is well illustrated by a stay I made on Metavan plantations on Malekula in the New Hebrides. During a period of one month among a labour force of sixty-nine, recruited in the northern New Hebrides, six people lost thirty-four labour days from filarial infections, three of the legs, one of the axilla and breast, one of the axilla and arm and one of the knee joint.

Until some new method is attained for controlling the reproduction of mosquito vectors of filaria, the best preventive measure is to keep the village and an area around it clear of containers in which they may breed.

Mackay's report on the Tokelau or Union Group, population 1,029, concerning filariasis is interesting. These are people closely related to the Ellice islanders among whom O'Connor found 60% infected with filariasis. The atolls on which they live, are broken into islets, most of which are planted. On each island the whole population lives on one small village islet.

Mackay says:

> Filariasis is not common, owing to the absence of mosquitoes in the village islets. Fifteen cases of elephantiasis were seen, probably of filarial origin. Elephantoid fever and muscle abscesses are rare.

Malaria.

Malaria in the South Pacific is limited to the north and west of 170° of east longitude and 20° of south latitude.

It is the most serious problem of this area and little can be done to control it there with our present knowledge of its prevention. The people live under stone age conditions and have the stone age attitude towards medicine. The control of malaria among natives in such countries as Papua, New Guinea, the Solomon Islands and the New Hebrides for centuries to come, one is tempted to say, will be expensive beyond possibility.

The type in these islands is predominantly subtertian. Tertian fever is common and quartan fever has been found in New Guinea (Cilento). Buxton found no quartan in the New Hebrides nor has it been reported from the Solomon Islands. Blackwater fever occurs in all these groups, but is not common.

The interest of preventive medicine in malaria in the South Pacific at present lies in keeping it within its present bounds, preventing its spread to Fiji, Samoa or New Caledonia.

One point I have never seen discussed in the malariology of Papua is that a walk of a few miles from the beach into the mountains of Papua among

untouched or practically untouched people brings one to a malaria-free belt. Where the white men's plantations have been established, as for instance back in the mountains from Port Moresby, to Itikinumu and Jawarere, a distance of about seventy miles, malaria abounds. This is also on the overland mail route to the north-east coast which is Melanesian and malarious. All the southern coast of Papua is malarious though this diminishes in the Delta region of Western Papua. But in from Yule Island as soon as the negroid type appears, with the woolly hair tight to the head and the other more purely negroid features, malaria disappears. These people are never recruited for labour because when kept on the coast invariably they die from malaria to which they seem to have no resistance. Why has malaria never appeared in the central west of Papua? There are no physical obstacles. The hills are full of streams which run into numerous rivers emptying into the sea; the rainfall is heavy; the temperature until the highest peaks are reached is never too cold. Malaria is found, except in one or two spots of very low rainfall, everywhere along the coast and in the north-east and east well into the interior.

It seems to me that malaria follows closely in New Guinea and the other islands the bounds in which the so-called Melanesian race lives. A lighter-skinned people coming round the north of New Guinea and overlapping the southern coast has mixed with the pure Papuan to make the Melanesian. This lighter-skinned man has brought the anopheline with him and malarial parasites in his blood.

Another peculiarity of malaria in Melanesia and Polynesia is its absence from nearly all purely Polynesian atolls or islands even in Melanesia near land masses which are malarious. These instances occur from the Bismarck Archipelago all the way down through the Solomon Islands, the Santa Cruz Group and New Hebrides. Most of such islands are coral and it may be that the porous soil offers no suitable breeding places for the *punctulatus* which alone has been able to survive beyond the borders of New Guinea.

Conclusions.

1. A summary of available evidence seems to indicate that the natives of the Pacific can survive and are increasing.

2. They are acquiring immunity to many imported diseases.

3. Most indigenous and imported diseases have been proved to be controllable.

4. Tuberculosis is not relatively a greater problem than elsewhere except in one group.

5. There is no satisfactory method of controlling malaria and filariasis.

6. A higher standard of soil sanitation and water supplies is desirable.

7. The native has demonstrated that he is a satisfactory medical man for his own people.

8. More vital statistics and more accurate ones are highly desirable.

CANCER AND CHRONIC INSANITY.

By W. A. T. LIND, M.B., B.S. (Melbourne),
Pathologist, Victorian Lunacy Department.

PROFESSOR CLELAND, of the Adelaide University, suggested to me that the publication of the incidence of cancer amongst the chronic insane would be of value to cancer research workers. I have therefore investigated cancer in patients over forty years of age who have been fifteen years or more uninterruptedly resident in a mental hospital. The idea of limiting the patients to those of fifteen years residence is to exclude those who became cancerous before they became insane, and those who developed cancer shortly after reception. By doing this we can show the incidence of cancer in those who have been living under known conditions and under observation for fifteen years. As the *post mortem* examination of every patient is compulsory by act in Victoria, the figures given are accurate. The general opinion seems to be that cancer is on the increase. The "Medical Annual," 1927, speaking of the incidence of cancer in the general population states that statistics are fallacious and asks whether civilization and culture constitute cancer predisposing or merely cancer revealing influences. J. E. Rush in *The Lancet*, 1925, Volume II, page 1036, states that 2,000 death certificates from an estimated 50,000 deaths from cancer were examined and it was found that in only 2% of the cases was the diagnosis confirmed by autopsy and in only another 9% had an operation confirmed the clinical diagnosis. "Obviously," writes Rush, "we have no statistics of sufficient accuracy at hand to be certain that cancer is increasing."

The *post mortem* records from Kew and Yarra Bend have been considered separately and conjoined because the former is the average type of mental hospital, while the latter was more of the chronic type of institution.

During the years 1913 to 1928 there were 1,673 *post mortem* examinations at Kew and of these 136 were upon patients who had been fifteen years in the institution and were over the age of forty. Of these 136 patients there were fourteen or 10·2% who had cancer as follows:

Cancer of stomach	4
Cancer of liver	2
Cancer of colon	1
Cancer of skin of hand	1
Cancer of lungs	1
Cancer of face	2
Cancer of tonsil	1
Cancer of tongue	1
Cancer of lower lip	1

At Yarra Bend during the period 1913 to 1924, when the institution was evacuated, there were 750 *post mortem* examinations and of the patients seventy-nine were over the age of forty and had been in the institution fifteen years. Among these seventy-nine patients there were seven cases of carcinoma and one of sarcoma, making a percentage of 8·8 carcinoma. Three had cancer of the stomach, one cancer of the liver, two cancer of the pancreas,

one rodent ulcer of the face, and one melanotic sarcoma of skin and lungs.

Taking both institutions collectively, we have 21 cases of carcinoma out of 215 possibles which gives the incidence of 9·7% carcinoma for the two places, which, speaking without reference, appears to be considerably below the figures given for the general population. In passing it might be mentioned that the incidence of gall stones in apparently normal gall bladders in patients over forty years of age with fifteen years residence in these institutions is so high as to convince one that gall stones are not a cause of carcinoma as some would have us believe.

The conditions of life in these patients are as follows:

1. Beds and bedding are those which the ordinary man would not appreciate unless he were dead tired. If the feet are cold, they stay cold.
2. Patients go to bed at eight and get up at seven.
3. Bathing day occurs once a week, unless especially requested or required.
4. Government clothing is coarse and not over abundant.
5. Periodical crowding occurs at meal times and when the patients are not in the airing courts.
6. Tobacco is supplied for working patients.
7. Until recently the care of the teeth has been that of removing a tooth if its removal were requested by the patient or if the patient developed a swelling from a carious tooth.
8. All patients except those who cannot chew or who are physically feeble, get the Government ration, which would not satisfy the palate of the average workman getting the minimum basic wage.
9. Weekly aperients are given.

The diet scale is as follows:

Breakfast.

Workers: A chop, bread and butter and tea.
Non-workers: Bread and butter and tea.
On two mornings in the week everybody gets porridge.

Dinner.

Soup twice a week and pudding every Sunday.
Meat, 16 ounces (with bone) for the men, 14 ounces (with bone) for women.
Potatoes, 12 ounces for men, 10 ounces for women.
Vegetables.

Tea.

Two slices of bread and butter and tea.

The bread allowance is eight ounces for breakfast and tea, and six ounces for the workers at dinner.

The epileptic and some toothless patients get their meat and vegetables in the form of mince.

That the diet is deficient in vitamin *C* is shown by the fact that every year scorbutus appears in some of the patients near the end of winter.

The food, as supplied, would be eaten by the ordinary man only when driven to it by hunger, which is really the correct way for the stomach to receive it. The sick and the bedridden get extras in the shape of rice, sago *et cetera*.

Having described the conditions under which the patients live and the incidence of cancer present, I leave it to those interested in the subject to evaluate the data supplied.

Reports of Cases.

SEQUELÆ TO ENCEPHALITIS LETHARGICA.[1]

By J. BENTLEY, M.B., B.S. (Edinburgh),
Inspector-General of Insane, Western Australia.

JUVENILE and adolescent patients suffering from *encephalitis lethargica*, with errors of conduct, present a social and occasionally a medico-legal problem of great interest to the medical profession.

These patients may not exhibit any delusions or hallucinations and the emotional disturbance may be so slight that there is a danger of it passing unobserved. This may place the doctor who is called on to give an opinion regarding a patient, in a position of the greatest difficulty and if care is not exercised, an injustice may be done to the sufferer.

A correct conclusion can be arrived at only by the study of the history and a knowledge of the residue of this disease.

Among some of the psychic disturbances which are met with, are restlessness, garrulity, foolish mirthfulness, irritability, mischievousness, destructiveness, violence, attempts at murder or arson, cruelty to children and animals, dishonesty, obscene language and conduct, including sexual offences. There is no evidence of shame; there is a complete disregard for the interests of others, together with the failure of self criticism.

These patients often lie, if there is the slightest chance of the lie being believed.

Bearing these points in mind, it is hoped that the two patients who are shown you tonight will be of interest.

Case I.

C.H., aged twenty-three and a half years, is at present a patient in the inebriate home.

He was brought before the court on a charge of stealing some milk. This he had demolished at 3 o'clock one morning. A policeman caught him in the act and arrested him. The court sent him to the inebriate's home, because the justices did not know quite what to do with him.

The history given by himself shows that he had an attack of "influenza" about three years ago. This lasted about three weeks. He states that following this attack of "influenza" he felt he was "all to pieces" and said his system had broken down. He is easily fatigued and for this reason is not able to employ himself at the home. He sleeps poorly and usually does not go to sleep until about 4 a.m. He frequently sleeps for an hour or two during the day.

Up to the date of the attack of "influenza" he was able to earn his own living as a labourer and apparently his work was satisfactory. Before the attack of "influenza" it was stated that he was strictly honest and a good worker.

Following the attack he went to his family at Cranbrook. There he committed a number of petty thefts, such as breaking into a shop and taking tobacco and soft drinks. He was brought to Perth by his mother and was admitted to the Perth Hospital.

There is a definite tremor of his limbs, head and body. His face is mask-like, being devoid of expression. His knee jerks were slightly exaggerated, cremasteric and abdominal reflexes normal. Babinski's sign was present on the right side. His left plantar reflex was normal. His pupils were equal and reacted to light and accommodation. Eye movements showed a slight lateral nystagmus. There is some weakness of convergence, but no diplopia and no contraction of his visual fields. His urine is very pale, its specific gravity is 1001 to 1002. No abnormal constituents are present. It was found that he drank approximately six gallons of water per day. No abnormality was discovered in other systems. A radiograph reveals no abnormality of his *sella turcica*. There were no delusions or hallucinations.

[1] Read at the Annual Meeting of the Western Australian Branch of the British Medical Association on March 25, 1928.

At the home he gave considerable trouble, for example he used to go out at night and milk the cow and drink the milk so that there was nothing left for the other patients' breakfast in the morning. He went to other patients at two or three o'clock in the morning and woke them up to ask them for a cigarette. At other times he woke up other patients because he said he did not see why they should sleep when he could not. He pulled some half-grown lettuces and left them lying on the ground.

Diagnosis.

From the above points it would seem that there is little doubt that the patient is suffering from *encephalitis lethargica*. The fact that he was well and able to do his work before the onset of "influenza" and that since then, as he expresses it, "he has been all to pieces and that his system has broken down"; that he lacks energy; that he has a definite Babinski sign on one side; that he has a slight lateral nystagmus and a weakness of convergence, seem to make the diagnosis clear.

This case has some resemblance to one of disseminated sclerosis, but such peculiar behaviour as the above is not usually found in the latter disease. The case is of further interest from the fact that the patient is suffering from *diabetes insipidus*, and this complaint began about eighteen months ago and is apparently a residue of encephalitis.

Case II.

L.H. was admitted on October 15, 1925, as a voluntary boarder for twelve months. His age is fifteen and a half years, his height 170 centimetres (five feet eight inches) and his weight is 69·3 kilograms (eleven stone).

Apart from the fact that two of his mother's sisters appear to have been unstable, there is nothing of interest in his family history.

The patient's previous illnesses include measles, chicken pox, diphtheria, whooping cough, *encephalitis lethargica* at the age of twelve and a half.

On physical examination the patient appears over-developed for his years. He has heavy and coarse features, flattened, thick lips and nose. There is no abnormality in his circulatory or respiratory system. Knee jerks are normal. Plantar reflex is flexor. No ankle clonus is present. Pupils are equal and react briskly to light and accommodation. Consensual reflex is present. No nystagmus and no tremors are present.

An X ray examination was made and the radiologist reported that the anterior clinoids are depressed slightly, but not diseased. The sella is perfect in form and size. The posterior clinoids are normal. It is doubtful whether any pituitary growth *et cetera* are present.

A further examination on March 12, 1928, disclosed a slight lateral nystagmus with weakness of convergence, especially the right eye.

At school he was well thought of by the head master who was interested in him because he knew the boy's parents. The head master thought him no saint, but a nice wholesome average lad, not good enough for the scholarship class.

Following on his attack of encephalitis, he was kept at home for two years and when he returned to school he was rather pampered on account of his illness. He then began to trade on his permission to sleep when drowsiness came over him and when he woke up he used to disturb the class, annoying the teacher by calling out inane remarks, believing himself to be free from punishment. At length he was removed from the school and he was sent to the Seaforth Boys' Home where it is believed he caused some trouble.

On his return he was again indulged at home, but it was not a success. He frequently left home on some excuse and his parents had no idea where he went. His father then endeavoured to put him on his mettle and told him he would have to get something to do. He went to the Labour Bureau and obtained work from a Mr. S. He travelled to the siding at which Mr. S. lived and instead of going to Mr. S.'s place he went to a neighbouring farmer and obtained work. He exhausted the patience of this farmer in two days, but they kept him for a week and gave him his fare to Perth. He got out of the train at Northam and stayed there for a week and nothing is known of his doings during this period. His father again sent him to work. This he obtained at a saddler's, but he behaved so badly that the police were called in to deal with the youth "unfit to earn his own living."

The police communicated with his parents and conveyed him home. About this time he began to go out both day and night and tampered with girls. His plan was to visit various neighbouring houses and if the parents were at home, he would have some excuse ready. If the parents were out he then entered the house and misbehaved.

A psychological test was done shortly after his admission and his credit was sixteen years and seven months, age fifteen years and five months.

He was discharged, his voluntary boarder's period having expired, on October 15, 1926, and was sent to the Perth Hospital. It is understood that the doctors connected with that institution had some difficulty in certifying him as insane.

During the period he has been at Claremont Hospital for the Insane he has been unable to control his actions. He states that he knows he is doing wrong, but he cannot give a valid reason for so doing. He frequently interferes with other patients, fights with them and inflicts injury on those who he thinks will not retaliate. The injuries consist of treading on their toes, burning their necks and hands with a lighted cigarette *et cetera*.

He is hyperactive and cannot settle to any work. He is very garrulous and comes forward with a number of trivial requests each day. He frequently makes complaints regarding other patients and attendants and these complaints have little or no foundation in fact. He is constantly demanding books and magazines and there is a great difficulty in keeping him supplied, as, for example, he states that he gets through one of Dickens's larger novels in an hour.

He is in the violent and noisy ward and the charge attendant reports that he is the most mischievous patient in the ward and takes a delight in annoying and tormenting other patients. He seems to have a strange power over other patients and can make them do almost anything he desires; for example he will make a patient lie down in the rotunda, while he uses the patient as a pillow and he makes the patient hold a book for him while he reads.

Reviews.

A YEAR'S PROGRESS IN MEDICINE.

THE MEDICAL ANNUAL for 1928 is styled by the publishers, "A Year Book of Treatment and Practitioner's Index."[1] This number is well up to the standard of its predecessors and will be eagerly purchased by busy practitioners who wish to gain a bird's eye view of the latest work. The book is full of interesting articles and it is possible to refer to a few of them. Purves-Stewart has written on epidemic encephalitis and his article has been supplemented by another by J. D. Rolleston. Harrison's *résumé* of the subject of syphilis is well worth reading. In the article on goître reference is made to the work of McCarrison, but none to the communications made at the Australasian Medical Congress, (British Medical Association) in Dunedin. Favourable mention is made of the paper by Wade and Royle, published in this journal, on ramisection in Hirschsprung's disease. Wilkinson's work on the Argyll-Robertson pupil is not mentioned; possibly it has not sufficient practical interest. Calmette's prophylactic vaccination against tuberculosis is discussed and the conclusion stated that the method is both safe and efficacious. Hipsley's work on the use of hydrostatic methods in intussusception is described as impressive and the opinion is expressed that the impressions on non-surgical reduction require readjustment. As might be expected, the articles on pernicious anæmia from the ætiological and therapeutic standpoints, are full and interesting. Not the least important article is one on the latest medical and surgical appliances.

[1] "The Medical Annual: A Year Book of Treatment and Practitioner's Index," by various contributors; 1928. Bristol: John Wright and Sons, Limited. Demy 8vo. pp. 632 with illustrations. Price: 20s. net.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 22, 1928.

The Aetiology of Cancer.

Not long ago the imagination of the people was fired by the dramatic announcement by Gye and Barnard of the discovery of a virus and an accessory factor to which they attributed ætiological properties in connexion with cancer. In discussing their work in this journal on September 5, 1925, we pointed out that they had adduced no evidence save in connexion with a mouse sarcoma to justify the assumption that the virus gained from mammalian tumours has any ætiological association with these tumours. There has recently been held in London an international conference convened by the British Empire Cancer Campaign and at this conference the hypothesis of Gye and Barnard seems to have received its death knell. In its place another hypothesis has been set up by Dr. J. B. Murphy. Unfortunately the experimental details have not yet been published and only the bare announcements of the main results of Dr. Murphy's experiments are available. It is curious to note that in *The British Medical Journal* of July 21, in the report of the conference there is a very brief and almost contentless summary of his remarks, while in the issue of the same journal of July 28, there is a leading article in which the chief contentions are set forth in a categorical rather than in a critical manner. In *The Lancet* there is a fuller and more lucid account of Dr. Murphy's contribution to the discussion and there is also a leading article on the subject, written in a spirit of healthy caution and scepticism. The subject transcends all the others debated at the conference in importance and demands notice, even if the information is meagre, while the mass of experimental evidence seems to be considerable. The medical correspondent of *The Times* appears to have garnered some data which have been either overlooked by the reporters of the two great medical journals or reserved for discussion at a time when all the details have been set out in print. The account in *The Times* has no doubt convinced a very large number of its intelligent non-medical readers that Dr. Murphy's contentions must be accepted and that his doctrine applies equally to human tumours and to chicken sarcomata.

From these various records it may be gathered that Dr. Murphy has been working with that form of sarcoma of the chicken known as the Rous tumour. He has extracted from these tumours by filtration a substance by means of which the same growth could be produced in other fowl. The filtrate seems to be adapted to one particular breed of fowl; sarcomata are induced in other breeds only after much coaxing and repeated injection. The filtrate was treated by precipitation and the tumour-producing fraction was found to reside in the nucleo-protein. Dr. Murphy states that this fraction yielded Feulgen's reaction of the thymonucleic acid group and that it produced tumours in fowls with great regularity. He has further isolated this substance from the testicle of normal fowls and has been able to produce tumours having all the qualities of Rous sarcomata. His contention is that the agent cannot possibly be a virus, for it would not have survived the precipitation of the nucleo-protein nor would it be found in the testis of the normal fowl. It is somewhat significant that Professor A. Leitch at the same conference postulated a growth substance, whose physiological function was to repair in the process of healing, and a growth inhibitory substance which arrested the action of the growth substance when healing was complete. When the growth inhibitory substance was absent or failed, the action of the growth substance continued and tumour formation resulted. It seems that Professor Leitch has experimented with a growth substance derived from pancreas which induced a definite proliferation of cells. Dr. Murphy regards the tumour-producing agent or substance as a ferment. It is resistant to ultra-violet radiation and seems to possess some specific affinity for special tissue cells.

It must be accepted that Dr. Murphy has experimental evidence to support these very definite

statements. The writer of the leading article in *The Lancet* is a little disconcerted at the somewhat loose qualification of his statement that the tumour-producing enzyme could be gained from the testis of the normal fowl with a considerable degree of regularity. Moreover, the writer of the article is not greatly concerned whether the agent is a virus or an enzyme. In the absence of fuller details, it is permissible to accept for the present the claim that the Rous sarcoma can be produced by the injection of an enzyme recovered from a filtered extract of the tumour in a fowl. Professor J. Ewing expressed the view that has been reiterated in these columns for many years. He stated that it was an unwarranted assumption that malignant growth was always essentially the same in its physical, chemical and physiological relations and that studies aiming to solve the whole problem at one stroke were destined to fail. Dr. Murphy and Professor Leitch have been experimenting with Rous sarcomata, as did Gye and Barnard. It is well known that these tumours are singularly transferable and it is in consequence not at all unlikely that the causative agent of this particular tumour exists in many situations and is easily secured. But it is the essence of temerity to argue from the Rous sarcoma to human carcinoma. We have objected in season and out of season to the application of findings relating to mouse cancers to the varied malignant growths that affect human beings. At the present stage it is impossible to determine whether all carcinomata of man are dependent on a common ætiological agent. It is unlikely that the causes of rodent ulcer, of endothelioma, of sarcoma and of epithelioma are identical. We must therefore enunciate as a tentative hypothesis that Dr. Murphy's very ingenious and suggestive work has no significance so far as the cancer problem is concerned. This statement, however, may be qualified in one direction. He has shown that the Rous sarcoma is not caused by a biological agent; it is produced by a chemical substance or by the physical property of a chemical body. The virus hypothesis of cancer has been losing ground rapidly in the course of recent years. Perhaps Dr. Murphy and Professor Leitch have disposed of it finally. This work may prove of great importance in another direction. It may open up a path for investigation that will throw light on the obviously complicated processes which are concerned in the ætiology of that group of diseases commonly spoken of as cancer.

Current Comment.

ALKALOSIS IN PEPTIC ULCER.

In the Sippy treatment of peptic ulcer food is given at short intervals, generally of one hour, and the acid in the stomach is controlled with alkalis given between each feeding. The drugs used are the carbonates of magnesia and of calcium and the bicarbonate of soda. It is but to be expected that the intake of comparatively large quantities of alkali, extending over a considerable period of time, will have an effect on the hydrogen ion concentration of the body fluids. The hydrogen ion concentration of the blood and other body fluids is maintained at practically a uniform level in the neighbourhood of pH 7·35, just on the alkaline side of neutrality. Symptoms due to alkalosis may arise as a result of alkaline treatment. The symptoms commonly described are: headache, nervousness, nausea, vomiting, pains in the joints and muscles, weakness, slow respiration, rapid pulse, flushing of the face and sweating. They found that when the alkaline treatment was discontinued, the symptoms disappeared. W. E. Gatewood, O. H. Gaebler, E. Muntwyler and V. C. Myers have recently discussed this question.[1] They have tried to find out how frequently the clinical symptoms of alkalosis accompany definite changes in the acid base equilibrium. They have also studied the effect of the various alkalis used in routine treatment, the effect of vomiting and of aspiration of large quantities of gastric juice and the shift of the acid base balance after relief of pyloric obstruction by gastro-enterostomy. The patients studied were persons in the medical wards who were being treated for peptic ulcer. The chief symptoms observed were headache, drowsiness, anorexia, nausea, vomiting, muscle ache, nervousness and mental depression. Other less common nervous symptoms included those already mentioned. It is not necessary to enumerate the patients who manifested each of these symptoms. There was a definite correlation between the symptoms and the alkalæmia. In about two-thirds of the patients there was found a high carbon dioxide content of the blood or a high pH or both and twenty-one manifested an uncompensated alkalosis. The standard adopted for the latter determination was a pH value of 7·48 or above, as estimated by the electrometric method. Symptoms were not present in all these patients with alkalosis. From one table it is seen that nine of the twenty-one patients had no symptoms and that one patient had symptoms of alkalosis before alkalis were given, but that the symptoms

[1] *Archives of Internal Medicine*, July, 1928.

disappeared after oxide of magnesia and calcium carbonate had been given for eleven days. The pH of this patient's blood was 7·52 at the first examination and 7·44 at the second. It was found that in some instances the symptoms of alkalosis appeared early, even within the first twenty-four hours of the administration of alkalis. More commonly the symptoms and the changes discovered in the blood on chemical examination appeared much more gradually and either appeared or became most pronounced after a week or ten days of the alkali treatment. If the symptoms did not appear within the first two weeks of treatment with alkalis, they were not likely to become manifest later. Six patients had definite pyloric obstruction associated with symptoms of alkalosis. These will be referred to later. It was also found that when calcium carbonate and magnesium oxide were given without soda, alkalæmia was less severe and the clinical symptoms of alkalosis were unlikely to appear, especially if the complication of obstruction was not present or vomiting did not occur. The changes produced by the alkalis were most pronounced at the end of the day and during the night the condition tended to return to normal with the rise in the blood bicarbonate; there was a corresponding fall in the chloride content of the plasma. It is further stated that the disagreeable symptoms of alkalosis were seen most commonly when the plasma chloride was low and definite. Improvement occurred when sodium chloride was administered, especially by the intravenous route.

In explanation of the work it may be pointed out that alkalosis is a condition in which the concentration of bicarbonate in the blood is raised above the normal level; the carbon dioxide tension of the blood is thus the determining factor. The process of regulation is of a physico-chemical nature and depends on the presence of so-called "buffer" substances. It has been found that weak acids like carbonic and phosphoric acids possess the property of maintaining the reaction at a tolerably constant level when they are present in a solution which also contains their salts. This action of bicarbonates and phosphates is known as buffer action; in other words they serve to damp down the effect on the hydrogen ion concentration which would otherwise be produced. Bayliss held that it would be better to use the words "tampon action" because the substances actually soak up much of the added hydrogen ions. For the maintenance of neutrality there must be some provision for the supply of the acid and basic substances that take part in the process and also for the removal of the substances produced by the reactions. The source of supply is partly exogenous and partly endogenous. The endogenous source depends on the constant production in metabolism of such acids as carbonic acid, phosphoric acid, lactic acid and so forth and of alkalis such as ammonia and fixed alkali, a considerable reserve of which is available in the organisms. The exogenous source consists of the basic and acid substances present in the food. In the Sippy diet treatment an excess of alkali is added in order to neutralize the gastric acidity associated with ulcer. In the circumstances it would be expected that the carbon dioxide tension of the blood would be high and that the chloride content would be low, for the chlorides are the ultimate source of the hydrochloric acid of the body. It was amongst those with low chloride values that symptoms of alkalosis were more pronounced and the carbon dioxide content of the blood of patients whose acid base balance was disturbed, was high. When pyloric obstruction is present, there is an additional factor to cause an upset of the balance for much of the acid of the stomach is removed by vomiting. A distinction must be made between compensated and uncompensated alkalosis. In seventeen patients in the series under discussion the carbon dioxide content was high, ranging from 68·3% to 94·0% by volume, but the pH readings ranged from 7·39 to 7·46. The fact that symptoms of alkalosis were not likely to appear after two weeks of treatment if they had not been manifest before that time is probably to be explained on the basis of a compensated alkalosis. Gatewood and his collaborators have evidently estimated the pH in patients as they were under treatment, they have not stated what the pH was before treatment was started nor do they give any indication of the interval of time which elapsed between the administration of the drugs and the various blood estimations. The general conclusion may be drawn, however, that symptoms of alkalosis need not be expected to appear if the pH is below 7·48. As the pH rises above this level, symptoms will probably occur and when it has reached 7·52 they will almost invariably be present and severe.

The clinical value of this work is obvious and need not be discussed at any great length. The importance of the recognition of alkalosis during treatment with alkalis should not require emphasis; the alkalosis in these circumstances is not, however, recognized so readily as is acidosis in such conditions as diabetes. This must be remembered when patients with gastric or duodenal ulcer are given alkaline powders to use at home and apart from continuous medical supervision.

THE MINISTRY OF HEALTH BILL.

A BILL has been introduced into the Legislative Council of Victoria to amend the *Health Act*, 1915. The measure provides for the establishment of a Ministry of Health under a minister with a permanent head to act as secretary, a Chief Health Officer, an Inspector-General of Mental Hygiene and a Chief Sanitary Engineer in charge of three branches. The second reading was postponed from August 28 to September 11, 1928, to enable the Minister to receive a deputation from the Victorian Branch of the British Medical Association. Mr. H. I. Cohen supported the Victorian Branch in the claim that the permanent head should be a medical practitioner. The second reading was carried. The measure will be dealt with in detail in a subsequent issue.

Abstracts from Current Medical Literature.

RADIOLOGY.

Osteitis Deformans and Metastatic Carcinoma.

C. G. SUTHERLAND describes the differences between *osteitis deformans* and osteoplastic metastatic carcinoma (*Radiology*, February, 1928). *Osteitis deformans* is characterized by extensive resorption of the bone by osteoclasts and extensive new bone formation by osteoblasts on the old bone so that the cortex, which has at first become rarefied, now becomes dense, especially in the skull. The bone marrow becomes replaced by fibrous tissue with irregular bony lamellæ. Subperiosteal new bone leads to thickening of the bones and occasionally cysts are formed. It is most common in the spine, pelvis, head, femur and tibia. Carcinoma of the prostate is most commonly associated with bony metastasis in males; the tumour cells lodge in the venous sinuses causing stasis and hæmorrhage, followed by reactive bony tissue. The cells become enclosed in bone and irregular bony formations occur with extensive bone resorption. The commonest site for metastasis is in the ilium near the sacro-iliac joint, showing "spottings" of increased density on a background of apparent bone destruction. The lesion is generally unilateral, while in *osteitis deformans* it tends to be bilateral. With extension of *osteitis deformans* to the femur the diagnosis from malignant disease becomes easier owing to the deposition of subperiosteal bone in the former condition.

Caecal Carcinoma.

W. W. BELDER (*Radiology*, February, 1928) reports a case of colloid carcinoma of the caecum. The X ray examination revealed a constant spasm of the stomach which led to the diagnosis of hour-glass stomach. Such hour-glass constriction is rare in the absence of gastric disease, yet it seems that the possibility of such an appearance must be kept in mind when caecal disease is present. *Post mortem* an hour-glass gastric constriction was noted, but there was no organic disease present. Twenty-four hour ileal stasis was present with distension of the ileum on X ray examination and the pathological finding was colloid carcinoma of the ileo-caecal junction.

Infantile Scurvy.

R. S. BROMER (*American Journal of Roentgenology*, February, 1928) writes on the Röntgen ray diagnosis of infantile scurvy. The most frequent pathological change is a subperiosteal hæmorrhage especially occurring in the lower extremities. Epiphyseal separations may accompany these hæmorrhages. On radiographic examination a dense band is noticed in the epiphyseal line, while next to this on the side of the shaft is the area of greatly weakened bone (decreased density). Atrophy with a "pencil-point" appearance of the neighbouring cortex is seen in the ends of the shafts. In advanced cases spurs occur lateral to the ends of the diaphysis.

X Ray Examination in Disease of the Mastoid.

H. K. TAYLOR (*American Journal of Roentgenology*, June, 1928) refers to the help given by X ray examination in the diagnosis of mastoid disease. The aural surgeon should not expect a diagnosis from the radiologist nor should he ask for indications for or against operation. He should, however, expect to receive information on the anatomical variations from the normal. The film should reveal (i) the size and extent of the mastoid process, (ii) the character of the cells, whether of the small or large, pneumatic, diploetic, sclerotic or undeveloped types. The internal and external auditory meatus should be shown and also the region of the antrum. The tip of the mastoid, the lateral sinus wall and the mastoid emissary vein should also be recognizable. The two mastoid areas are generally identical. The sclerotic and underdeveloped types present a more or less homogeneous shadow and at times a porous appearance; they represent a failure in pneumatization or obliteration of the existing cells. The first changes in acute mastoiditis appear in the antral region. The mastoid vein is usually situated between the tip of the mastoid and the knee of the sinus. In patients under three years of age mastoid examinations are of no value. Normally the cell walls cast definite shadows. Hyperæmia from middle ear inflammation causes decreased definition. Exudate and granulation cause definite cloudiness. Thinning and destruction are caused by intrinsic mastoid disease and are signs of suppuration. Necrosis later follows with destruction of the bony trabeculæ. When the sinus wall is more clearly defined on one side than the other, it is a sign of involvement of the former side.

Cholecystography.

I. H. LOCKWOOD AND E. H. SKINNER present an analysis of the results of 1,500 cholecystographic examinations (*Radiology*, July, 1928). The authors recommend examination of the gastro-intestinal tract in addition to the Graham test. The oral method is used and the patient is examined in two planes before administration of the dye. On the day of capsule administration the patient has the bowel cleared by enema. At noon a meal rich in fats and cream is given; at 6 p.m. tea and toast only are allowed. The capsules are given in four doses at fifteen minute intervals at 8 p.m. and bicarbonate of soda is given before the capsules. For each 2·25 kilograms (five pounds) of body weight 0·06 gramme (one grain) of the salt is given. No food is allowed after the pills have been taken until the X ray examinations are made. No contraindications exist when the oral method is used. When the findings were checked by operation they were correct in 96·4% of cases. In pernicious anæmia 70% of patients manifested pathological change in the gall bladder, while in myocardial degeneration the percentage was 71. One hundred and eleven of one hundred and sixty-eight patients with infective arthritis manifested pathological change in the gall bladder and twenty-four had gall stones.

Pitfalls in X Ray Examination of the Gall Bladder.

J. T. CASE (*Radiology*, July, 1928) discusses some pseudo-vesicular shadows and other pitfalls in X ray examination of the gall bladder. Before the Graham test was introduced ovoid shadows were frequently found in the gall bladder region closely conforming in size and shape to the gall bladder and these shadows were interpreted in terms of gall bladder pathology. With superfine technique it may be possible to demonstrate a normal gall bladder, but many of the supposed gall bladder shadows are due to other causes. The duodenum and the pyloric end of the stomach may cast a shadow or the shadow may be due to the Spigelian lobe of the liver. This misleading shadow is frequently seen in patients who have had the gall bladder removed. The shadow cast by the gall bladder filled with dye can frequently be demonstrated at a distance from the pseudo-vesicular shadow. The so-called "gall bladder impression" on the duodenal cap is rarely due to the gall bladder, but usually to one of the liver lobes.

Diaphragm Eventration.

A. E. USPENSKY reports five cases of eventration of the diaphragm occurring in children (*British Journal of Radiology*, June, 1928). Eventration of the diaphragm occurs in four forms: (i) Gastro-intestinal, with lesions of the stomach or intestines; (ii) cardiac, associated with disordered heart function; (iii) pleuro-pulmonary, when respiratory disease is present; (iv) a mixed group with emaciation, intoxication and infantilism. Diagnosis was made on the evidence afforded by screen examinations. Asymmetry of movement of the costal cartilages is usual. The author considers the condition to be due to an anomaly in development of the diaphragm. The condition is frequently associated with pleural adhesions, meteorism and aerophagy.

Pulmonary Neoplasm.

J. R. BEAL AND E. D. GRAY report a case of rare pulmonary neoplasm of the cavernous type (*British Journal of Radiology*, May, 1928). The patient had pain in the left side of the chest below the scapula, the pain was continuous in nature and worse when the patient was in bed. Slight cough was present, with pink expectoration; no loss of weight occurred. Percussion note was dull over the ninth rib posteriorly and breath sounds, vocal resonance and fremitus were absent over this area. No reaction occurred to the Wassermann test. The X ray

film revealed a large thick-walled cavity in the left side of the chest posteriorly and this contained fluid and gas. At operation it was found impossible to remove the mass, but portion was excised for examination. It proved to be epithelioma and the resected rib was affected by epitheliomatous infiltration.

PHYSICAL THERAPY.

A Biological Measure of X ray Dosage.

CHARLES PACKARD (*The Journal of Cancer Research*, October, 1927) describes his experimental work on the lethal effects of X rays on the eggs of *Drosophila* (the fruit fly). He found that when the intensity of the X rays was 0·10 erythema dose per second or greater and when the wave length lay between 0·20 and 0·70 Ångström units, the biological effect was correlated with the dosage expressed in Röntgen units. This does not imply that the two are parallel. That is, if 50% of the eggs are killed by 180 Röntgen units, it cannot be held that 100% will be killed by 300 units. It is found that 75% of the eggs hatch after a dose of 130 Röntgen units, 50% after a dose of 118 and 25% after a dose of 300. The death ray is independent of the quality of the beam within the limits of wave length investigated. So that it follows that any X ray beam composed of homogeneous or heterogeneous rays within these limits which kill, for example, 50% of the eggs is delivered by 118 Röntgen units. The actual work is carried out as follows: The eggs are placed at the desired distance from the target and portions are removed at regular intervals, which may be five, ten or fifteen minutes when the intensity is high or even twice as long when the intensity is lower. The longest exposure should kill more than half the eggs; several hundred eggs should be treated for each length of exposure. If it is found that one-half of the eggs is killed in ten minutes, the dose at the distance used is eighteen Röntgen units per minute and in this way the number of Röntgen units delivered in any length of exposure can be found if the distance at which the eggs are placed from the target is taken into consideration.

The General Effect of Röntgen Rays.

H. ZACHERL (*Strahlentherapie*, 1926, *Band* XXIII) discusses the general effect of Röntgen rays. In the white rat three hours after irradiation there is a distinct increase (almost double) over the original value of white blood cells, this increase persisting, however, only a short time. At the fifth hour there occurs a distinct drop in the number of leucocytes. The decrease continues fairly rapidly and the number drops in many instances to five hundred leucocytes per cubic millimetre. The differential count, especially during the period of leucocytosis, shows a striking increase in the polymorphonuclear leucocytes at the expense of the lymphocytic elements. This is followed shortly afterwards by a mild relative increase of the large lymphocytes and eosinophile cells. Following these experiments on individual animals, the author made experiments on parabiotic animals joined by cephalic anastomosis. White rats weighing 150 to 180 grammes were employed, the irradiations being given fourteen days after operation. The rays were produced by a "*Symmétrie*" apparatus, with two milliampères of current and a spark gap of 38 to 40 centimetres; the time of exposure was forty minutes. This exposure led to death of the animal in three to four days. In the case of the parabiotic animals, one individual was exposed to the rays and the other was protected. It was found that the unexposed animal exhibited the same leucocytic response as the irradiated animal. The same was observed for the temperature drop. In those instances in which the dose was fatal for the exposed animal, the joined animal died at the same time or one hour afterwards at the latest. The only observed clinical difference in the response of the two animals was that the unirradiated animal had no diarrhœa and manifested no intestinal symptoms. These experiments seem to indicate that Röntgen rays cause the production of some toxic substance capable of producing sickness and death in the animal. Other experiments seem to indicate that the electrical charge of the organism and action of poisonous gases arising during irradiation are of no important significance in the occurrence of Röntgen intoxication. Enzyme studies revealed an increase in peptidase only in the late stages, while in the first few days after irradiation there was a slight decrease in the peptolytic index. This absence of a higher index in the face of an early direct cell injury is very striking and raises the suspicion that Röntgen rays might have caused destruction of enzyme. An attempt was made to confirm this suggestion, but the results of the experiments were indefinite.

Neurogenic Sarcoma.

DOUGLAS QUICK AND MAX CUTLER (*Annals of Surgery*, December, 1927) state that in the belief that most of the spontaneous and intramuscular tumours commonly designated as fibrosarcoma, spindle cell sarcoma and fascial sarcoma are of neurogenic origin, all tumours presenting these features have been included under the term neurogenic sarcoma. The serious nature of these small movable subcutaneous tumours is generally unrecognized and they are commonly regarded as benign fibromata. Repeated incomplete excisions frequently result in local recurrences at a stage of the disease at which irradiation and adequate surgery would result in a cure. Because of the radio-resistance of neurogenic sarcoma and the radio-sensitivity of tumours with which they may be confused clinically, the therapeutic test may be of practical value in the differential diagnosis. Of twenty-four patients with tumours of the extremities (excluding tumours of the thigh) twelve died and twelve are alive and free of disease three to nine years after treatment. Five of the patients were subjected to amputation and seven were treated by the conservative measures of excision or irradiation or both. Neurogenic sarcomata of the thigh offer a bad prognosis, only two out of fifteen patients in the authors' series being alive. The structure frequently encountered in this group is myxosarcoma. The unfavourable location and the high grade of malignancy account for the unfavourable results. Ten amputations for tumours of the extremity resulted in five cures and five deaths from pulmonary metastasis. The histological structure of the tumours in which amputation failed, was unusually cellular and highly malignant. It is believed that the result of amputation depends upon the degree of malignancy rather than upon the extent of the disease. Eighteen patients with neurogenic sarcoma are well and free from the disease three to nine years after treatment. Seven had small operable tumours treated by excision and post-operative irradiation. "Cure" resulted. Of eleven patients with advanced tumours five were "cured" by amputation, one by wide local excision and in five patients with advanced inoperable growths excellent results were obtained by intensive, external and interstitial irradiation. Metastases are known to have occurred in 20%. In no instance was pulmonary metastasis observed from the acellular fibrous type of growth. An analysis of the failures reveals three outstanding features: High malignancy, advanced stage of the disease and inadequacy of treatment. Hence inadequate irradiation is held responsible as one of the factors in the unfavourable results. Since the degree of malignancy cannot be determined clinically, pre-operative irradiation is indicated in all neurogenic tumours in an attempt to obviate the rapid recurrence following simple excision of the very malignant type. Heavy external irradiation alone or combined with interstitial irradiation is the method to be employed in the treatment of the inoperable tumours. This results in relief of pain and arrest of the disease in many instances and complete cure in some. The authors' studies indicate that pre-operative irradiation, followed by wide local excision and immediate post-operative irradiation, is the most satisfactory method in the treatment of the distinctly operable neurogenic tumours (excluding the extremely cellular type). The rapid response of the soft part of a subcutaneous tumour to external irradiation is an indication of its highly cellular and malignant nature and a contraindication to either interstitial irradiation or surgical removal. Prolonged external irradiation is the best method in the treatment of this type of growth. Brief citations are given of seventeen "cured" patients in this series.

British Medical Association News.

SCIENTIFIC.

THE ANNUAL MEETING OF THE EYE AND EAR SECTION OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Victorian Eye and Ear Hospital on July 16, 1928, DR. J. F. SPRING, the President, in the chair.

Division of the Section.

On the motion of Dr. E. W. Gutteridge, seconded by Dr. Clive M. Eadie, it was decided to form a separate eye section and a separate ear, nose and throat section.

Diathermy in Deafness.

DR. W. KENT HUGHES showed a patient who was suffering from chronic catarrhal deafness of old standing. The patient had been treated by diathermy with considerable improvement.

Rodent Ulcer of the Face.

Dr. Kent Hughes also showed a patient from whose face he had removed a rodent ulcer with the endotherm knife. He drew attention to the small amount of scarring which resulted from the use of this instrument.

Lesion of the Third Nerve.

DR. J. F. SPRING showed a male patient, aged fifty-three years. The vision in the patient's right eye was $^1/_{60}$ and in the left eye $^6/_{12}$. The tension was normal. Both pupils were dilated. Immature cataracts were present. The right pupil did not react to eserine, but the left pupil reacted slightly. The fundi were but poorly seen and were apparently healthy. All the external muscles appeared to be normal. The Wassermann test had so far not been made and in its absence it was assumed that the dilated pupils were due to a third nerve lesion, possibly of syphilitic origin.

Chorioiditis and Optic Neuritis.

Dr. Spring also showed a patient, the vision of whose right eye was $^6/_5$ and of the left $^6/_9$. The patient complained of poor vision in the left eye. The urine contained neither albumin nor sugar. The patient had suffered from facial paralysis at birth and two months before the meeting had been knocked down by a motor car. Old chorioiditis could be seen in the left eye and in addition there was optic neuritis which appeared to be recent.

In the discussion which ensued there was general agreement that the optic neuritis was of recent origin.

Lesion of the Limbus.

Dr. Spring's third patient had suffered for two years from a small brownish swelling of the limbus on both the nasal and temporal sides. There was no irritation and the patient sought relief purely on account of the appearance.

Dr. Spring was not prepared to give the condition a name, but members present considered that, in spite of the absence of irritation, the condition was a bulbar spring catarrh.

Lupus of the Conjunctiva.

Dr. Spring's fourth patient had $^6/_4$ vision (partly) in the right eye and $^1/_{24}$ in the left eye. There was evidence of old nasal disease with much scarring. A coarsely granular condition of the conjunctiva was present on the nasal side of the cornea of the left eye, it also extended downwards and invaded the margin of the cornea. There was no history of injury. No reaction had attended the application of the Wassermann test, but a slight partial reaction had followed the use of the Kolmer test. A small piece had been removed and the pathologist had reported definite round-celled infiltration in the subepithelial tissue, of a chronic inflammatory nature. There was nothing in the section to indicate the cause of the infiltration.

Members agreed that the condition was tuberculous and that the old nasal trouble was due to lupus.

Medical Societies.

THE NEWCASTLE HOSPITAL CLINICAL SOCIETY.

A MEETING OF THE NEWCASTLE HOSPITAL CLINICAL SOCIETY was held at the Newcastle Hospital on July 5, 1928. The meeting took the form of a series of clinical demonstrations.

Lupus Vulgaris.

DR. IDRIS MORGAN showed a woman, aged fifty-eight years, who was born in Victoria and had never been out of Australia. She had been engaged as a "slum worker" for many years before she became ill. Her grandmother had died of pulmonary tuberculosis at the age of twenty-seven years. Her mother had suffered from pulmonary tuberculosis, but had recovered.

About seven years previously the patient had noticed a small red sore on her face about 2·5 centimetres (one inch) from the left corner of the mouth. She had had a severe "nervous breakdown" at the time and had not taken much notice of the lump. Gradually the affected area had spread until at the end of seven years the whole of the upper lip, face and both malar regions were affected and the disease was spreading on to the left supraorbital margin. The area was red and inflamed, exhibited a sharply defined margin in places and typical "apple jelly" nodules were to be seen in various places at the spreading edge. There was an acute conjunctivitis and watery discharge came from the nose. The lupus involved the nasal and buccal mucosa and the inflammatory condition was due to superadded micrococcal infection. The patient had only allowed palliative treatment to date.

The interesting point was that this patient was born in Australia and had never been out of the country.

Abdominal Tumour.

Dr. Morgan's second patient was a half-bred Chinese, aged fifty-eight years, employed as a brewery worker, who had reported a few days previously complaining of abdominal pain after food, dyspepsia and frequent vomiting accompanied by loss of weight. The family history did not contain anything of importance. No previous serious illnesses had occurred.

The patient had worked amongst sheep for many years prior to commencing his present employment. He stated that he had been "off colour" for twelve months. Three months previously his symptoms had become "a bit worse." Acute symptoms had been present for the last three weeks. He had noticed a lump in his left side which he attributed to an accident at work. On examination of the abdomen a large, smooth, rounded swelling could be palpated, extending from the seventh rib in the mid-axillary line to the iliac crest forward almost to the umbilicus and posteriorly to within a few inches of the vertebral column. A distinct notch was palpable at about the mid-point of the anterior border of the swelling and the lower pole just above the iliac crest gave a thrill on percussion suggestive of fluid under moderate tension.

The liver was not enlarged nor were there any enlarged glands to be found. The examination of the other systems revealed no abnormality. The blood gave no reaction when subjected to the Wassermann and Casoni tests. No abnormal constituents were found on examination of the urine.

The blood examination gave the following results:

Erythrocytes, per cubic millimetre ..	3,430,000
Hæmoglobin value	85%
Colour index	1·2%
Leucocytes, per cubic millimetre	6,875
Polymorphonuclear cells	75%
Small lymphocytes	18%
Large lymphocytes	7%
Eosinophile cells	nil

A bismuth meal had been given and the films shown at the meeting showed that the stomach was pushed across to the right and that the transverse and descending colons were also displaced. The left side of the diaphragm was pushed up and the heart was pushed across to the right. A large apparently rounded mass occupied the position described above. The film did not show whether the con-

dition was in the kidney or spleen. A pyelogram was also exhibited and a catheter could be seen running from the bladder obliquely inwards, upwards and forward towards the umbilicus.

The pelvis of the kidney was filled, but did not manifest any great abnormality. The position of the pelvis of the kidney was near the umbilicus. A barium enema had not been given at the time of the meeting.[1]

A very interesting discussion followed the exhibition of this patient.

DR. E. M. MCCAFFERY maintained that a typical hydatid thrill was present at the lower pole of the tumour and on this he based a diagnosis of hydatid of the spleen.

The majority present seemed to favour a diagnosis of neoplasm of the kidney. A renal efficiency test had not been performed at the time of the meeting. Mesenteric cysts, pancreatic cysts, cystic kidney were also suggested.

DR. KEITH WATKINS related the history of a patient with a similar condition whom he had seen in London. The swelling had remained undiagnosed until operation and had proved to be a large mass of fæces, 30·0 by 12·5 centimetres (twelve by five inches).

Lupus Erythematosus.

Dr. Idris Morgan also showed a woman, aged thirty-five years, who was suffering from *lupus erythematosus*. There was nothing of importance in the family history. Eleven years previously a small speck "like a blackhead" had appeared on the tip of her nose. She had scratched it and it had gradually commenced to spread and to become scaly. It had been treated with carbon dioxide snow but had gradually spread until at the time of the meeting it presented a "bat's wing" appearance. The whole of the skin of the nose was involved and there were two wing-like processes of the lesion extending symmetrically towards either malor prominence. The greater portion of the lesion was covered by a bluish grey scale which desquamated frequently. The present appearance was a very typical bat's wing, but the hands, cheeks and ears were frequently affected asymmetrically.

This patient complained of rather severe itching which was not common.

The two common forms of the disease were the erythematous and scaly types. This patient exhibited the greyish mortar-like scale, which was the pathognomic of the scaly variety. The scales also exhibited, when removed, the stalactite-like processes described in the textbooks.

It was interesting to note in view of the theory that *lupus erythematosus* was a toxic eruption that this woman had been operated upon for a *fistula in ano* a month or so previously. As Dr. Morgan had seen her for the first time only that afternoon, he had not been able to search for any focus of infection.

Adeno-Carcinoma of the Kidney.

DR. S. GARDINER showed a boy, aged four years, from whom he had removed an adeno-carcinoma of the kidney. This report will be published in a subsequent issue.

Antral Infections.

DR. KEITH WATKINS said that infections of the maxillary antra were generally chronic and the usual type was one in which the patient had few, if any, symptoms besides those of a nasal or post-nasal discharge. In fact the patient complained of nothing except "catarrh" and an X ray examination or antrum puncture was necessary to demonstrate if the antra were infected.

However, the grades of antral infection varied and as the severer forms were encountered there were seen those patients with nasal discharge *plus* headaches, those with nasal discharge *plus* headaches *plus* swelling or tenderness over the antra, and eventually the very acute types were reached, perhaps with cellulitis of the face and even necrosis of the antral walls.

As far as general symptoms went, there might be none, but more commonly there was a mild degree of chronic ill-health, with a tendency to bronchitis, going on to bronchiectasis or of gastric disturbances caused by the swallowing of pus. Quite a number of these patients gave a history that they had suffered from catarrhal jaundice, whilst others stated that they had been treated medically as sufferers from gastric ulcer for many years and yet as soon as the antrum infection was cured the gastric symptoms disappeared. As far as hæmic changes went there was quite commonly an anæmia and the change in the appearance of patients after they had had an antrum operation was frequently remarkable from the point of view of the colour of their complexion. Actual blood infections from the antra were very rare, so much so that he thought it was worth while showing the following patient.

A girl, aged ten, had been referred to him by Dr. Pittar on February 2, 1928, suffering from an orbital swelling.

The history was that two or three days before he saw her she had put a number of different small foreign bodies up her nose. These had been removed and had left a right nasal discharge. Three days before he saw her she had complained of headache and the right eye had become sore and the lids had begun to swell. On examination the right upper eyelid had been found to be enormously œdematous, the lower lid less. There had been no true exophthalmos and all movements of the right eye had been very much impaired. She had been partially delirious and her temperature had been 40·2° C. (104·5° F.). She had had no rigors.

The tentative diagnosis of orbital cellulitis had been made and he had operated upon her the same day. A curved incision had been made along the upper and inner borders of the right orbit and the periosteum had been stripped off the orbital roof and median wall. The floor of the frontal sinus had been found intact and there had been no perforation from the ethmoidal cells. The periosteal orbital sheath had been opened, but no free orbital pus had been found. However, it had been noticed that pus could be expressed from cut orbital veins. The antrum on the same side had been punctured and washed out. A large quantity of foul pus had been obtained. The child's general condition had remained precarious, her temperature being almost continuously between 38·9° and 39·4° C. (102° and 103° F.) for two to three weeks and her mental condition had varied from coma, through mild delirium to practically normal. The antrum had again been washed out on several subsequent occasions. After the operation a diagnosis of infective orbital thrombosis had been made, the infection evidently had passed from the antrum to the pterygoid venous plexus, through the anastomosis leading up through the inferior orbital fissure into the inferior orbital veins. Any further spread from here would, of course, have involved the cavernous sinus.

After a long and severe pyæmia in which she had had infective infarcts in both knees, both ankles, right hip and right shoulder, she had practically recovered, except that she still had a low grade osteomyelitis of the left tibia which was subsiding spontaneously.

At an earlier stage in the disease she had developed a perforating ulcer of the cornea, but this had healed and left a moderate degree of vision. The infarcts in the right ankle, the right hip and the right shoulder had suppurated and a staphylococcal culture had been obtained from them.

The patient looked well and had no deformities except for the operation scar and the scarring of the corneal ulcer.

A Microscopic Slide Precipitation Test for Syphilis.

DR. T. HAMILTON demonstrated a modification of the Kahn test for syphilis which had been described by B. S. Kline of Cleveland, Ohio, in the *Journal of Laboratory and Clinical Medicine* of March, 1928. He said that Kline had modified the Kahn antigen, making with it an emulsion which remained stable for three days at ordinary room temperature and further had been able to carry out the test on a microscope slide, making the result easily readable by the low power of the microscope.

In order to demonstrate the simplicity of the test, Dr. Hamilton performed it in front of the meeting on serum from three patients who that day had been submitted to the Wassermann test. One serum precipitated the antigen emulsion and the result was positive for syphilis; the other

[1] After the meeting the urinary function was tested and found to be efficient. About one week after the meeting, an operation was performed and a large hydatid cyst containing many daughter cysts was found originating from the spleen.

two gave no reaction; these results tallied exactly with the results obtained by the Wassermann test.

It was pointed out that Kline had proved in a series of ten thousand cases that the slide precipitation test was as sensitive as the routine three tube Kahn test and possessed the following advantages over that method: (i) It was much simpler; (ii) it required less apparatus and much less serum; (iii) the results were easier to read. The test was of particular value when only small quantities of serum were available and when, as in emergency blood transfusions, prompt knowledge of the presence or absence of syphilis in the donor was desirable.

The slide precipitation test by Kline's method agreed closely with the Wassermann and was so simple to perform that it could be easily performed in country districts where elaborate laboratory facilities were not available. Furthermore, Kline had shown that it would often give a reaction with the serum of patients diagnosed clinically as suffering from early syphilis, while the Wassermann test still gave no reaction.

It is proposed to use the slide precipitation test at the Newcastle Hospital in conjunction with all Wassermann tests during the following six months in order further to prove its efficacy. Dr. Kline had kindly furnished Dr. Hamilton with an adequate supply of antigen for this purpose.

Correspondence.

A CORRECTION.

SIR: I desire to make a correction to the report of the Federal Committee Meeting appearing on page 252 of issue dated August 25, 1928.

It is as to the wording of a resolution moved by me, when the question of examinations for the fellowship of the Royal College of Surgeons was under discussion.

Dr. Kenny had forwarded a *résumé* of negotiations or communications that had taken place in this matter on behalf of the College of Surgeons of Australasia and the latter body had no further knowledge on the matter than that which had been forwarded to the Federal Committee by the Honorary Secretary.

On the face of these facts it would have been absurd to move a resolution in the words given in your report, namely: "That the Federal Committee approach the College of Surgeons of Australasia in order to ascertain what arrangements can be made" *et cetera*.

The Federal Committee had this question officially before it at the instance of the Queensland Branch and I considered that any information that could be obtained should be obtained directly from the College concerned and not from any other source and I moved:

> That the Federal Committee approach the College of Surgeons in order to ascertain what arrangements can be made for holding the primary examinations in Australia.

The insertion of the words "of Australasia" after College of Surgeons was certainly not in my motion and the whole discussion before the motion was moved would show the absurdity of the inclusion of such words.

Unfortunately the proceedings of the Federal Committee are reported before members have an opportunity of seeing and confirming the minutes and for this reason I hold that the report as appearing in the journal is not an official one.

Yours, etc.,

FRANK L. DAVIES.

High Street, Malvern, Victoria.
August 29, 1928.

Obituary.

JAMES FREDERICK ELLIOTT.

EFFICIENCY, energy, enterprise and humanity are qualities that have a strong appeal to the medical profession. It is therefore not surprising that great regret was manifested in Sydney among members of the profession at the death of James Frederick Elliott on September 9, 1928. He had been well known to many practitioners as the head of the great firm of Elliott Brothers, Limited, of Sydney, and as a director of Taylor and Elliott, Limited, of Brisbane. As a pharmaceutical chemist James Frederick Elliott was held in high esteem. He possessed an unusual amount of technical knowledge acquired in Berlin and London in the early years of his life. In later years he continued to acquire fresh information and to extend his interests by occasional visits to Europe and by assiduous reading. Although the main activities of the firms with which he was associated, were directed to agricultural channels, the production of pure galenicals has been a source of great satisfaction to him for many years and this fact had drawn him into close association with the medical profession. THE MEDICAL JOURNAL OF AUSTRALIA pays a respectful tribute in the name of the medical profession to the memory of a distinguished pharmacist and manufacturing chemist.

ROBERT STEER BOWKER.

WE regret to announce the death of Dr. Robert Steer Bowker which occurred at Sydney on September 15, 1928.

Naval and Military.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazettes*, Numbers 60, 70, 73, 83, 88, 90 and 97 of June 14, July 12, 26, August 9, 23, 30 and September 13, 1928.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH.

(SEA-GOING FORCES.)

Appointments.

John Reid Hasker, M.B., B.S., is appointed Surgeon Lieutenant (on probation), dated 8th May, 1928.

Confirmation in Rank.

Surgeon Lieutenants (on probation) Henry Coverley Maling and Brian Andrew Serjeant are confirmed in the rank of Surgeon Lieutenant, with seniority in rank of 16th June, 1927.

Surgeon-Lieutenant (D) (on probation) Leonard Malcolm Shugg is confirmed in the rank of Surgeon-Lieutenant (D), with seniority in rank of 20th July, 1927.

Termination of Appointment.

The appointment of Surgeon-Commander Ivor Stanley Gabe (Exchange Officer) is terminated on 8th May, 1928, on reversion to the Royal Navy.

AUSTRALIAN MILITARY FORCES.

First Military District.

Australian Army Medical Corps.

Honorary Captain V. F. O'Neill is appointed from the Australian Army Medical Corps Reserve and to be Captain (provisionally), 11th May, 1928; Captain (provisionally) A. D. A. Mayes is transferred to the Australian Army Medical Corps Reserve and to be Honorary Captain, 25th May, 1928.

The provisional appointment of Captain J. B. Gordon is confirmed.

Honorary Captain H. W. Anderson is appointed from the Australian Army Medical Corps Reserve and to be Captain (provisionally), 7th August, 1928.

To be Captain (provisionally)—Frank Garrett Scoles, 1st July, 1928; the provisional appointment of Captain G. F. Cherry is confirmed.

Australian Army Medical Corps Reserve.

Captain R. H. Leeds is retired, 12th July, 1928.

Second Military District.

Australian Army Medical Corps.

Major A. B. Lilley is transferred from the Australian Army Medical Corps, 1st Military District, and is supernumerary to the establishment pending absorption, 1st April, 1928. *To be Captains (provisionally)*—Lieutenants G. F. Lumley, J. Steigrad, C. C. McKellar, and K. C. T. Rawle, and Lieutenants (provisionally) R. S. Jones (supernumerary to the establishment) and F. G. Roberts, 1st July, 1928.

To be Major (provisionally) supernumerary to the establishment of Majors with pay and allowances of Captain.—Quartermaster and Honorary Major D. R. Brown, M.C., 1st July, 1928. The provisional appointment of Captain C. R. Cole is confirmed. Lieutenant-Colonel A. L. Dawson, D.S.O., relinquishes the command of the 4th Cavalry Field Ambulance, 30th June, 1928, and is transferred to the Australian Army Medical Corps Reserve, 1st July, 1928.

To be Captains (provisionally) supernumerary to establishment pending absorption—Lieutenant G. Cummins, from the Reserve of Officers, and Alistair Edward Martin Moir, 5th July, 1928, and 17th July, 1928, respectively. Captain (provisionally) W. J. O. Walker is brought on the authorized establishment, 1st July, 1928. The provisional appointment of Captain H. J. Foley is terminated, 9th August, 1928.

To be Captain (provisionally)—Horace John Foley, 10th August, 1928.

To be Lieutenant-Colonels—Majors A. C. Arnold, F. L. Bignell, D.S.O., and W. H. Donald, 1st July, 1928. Lieutenant-Colonel P. Fiaschi, O.B.E., V.D., is brought on the authorized establishment of Lieutenant-Colonels, 1st July, 1928. Lieutenant J. D. Cottrell is transferred (provisionally) from the Sydney University Regiment, 1st Division, and to be supernumerary to the establishment pending absorption, 17th July, 1928. The provisional appointment of Captain J. Leah is confirmed (in lieu of the notifications respecting this officer which appeared in Executive Minute No. 129/1928, promulgated in *Commonwealth Gazette*, No. 63, of 28th June, 1928).

The appointment of Major W. R. C. Beeston to command the 2nd Cavalry Field Ambulance is extended for a period of one year from 1st September, 1928.

To be Captain (provisionally) supernumerary to the establishment, pending absorption—Stanley Charles Matthew Hiatt, 21st August, 1928. The provisional appointment of Captain W. J. O. Walker is confirmed.

Australian Army Medical Corps Reserve.

To be Honorary Captain—Honorary Lieutenant W. A. Conolly, 1st July, 1928.

Honorary Captain J. A. Watt is retired, 6th July, 1928.

Third Military District.

Australian Army Medical Corps.

Captain W. Davis and Captain (provisionally) R. A. Sicree are brought on the authorized establishment, 23rd February, 1928; Captain J. G. Hayden ceases to be seconded, 19th March, 1928.

To be Captain (provisionally)—Lieutenant (provisionally) R. W. S. Fox (supernumerary to the establishment), 1st July, 1928.

Major P. A. Stevens is appointed to command the 6th Field Ambulance, 1st July, 1928, *vice* Lieutenant-Colonel F. E. Keane, M.C., who relinquishes the command on 30th June, 1928; the provisional appointments of Captains H. E. Pearce, C. H. Fitts, and J. H. Kelly are confirmed; Captain W. Davis is seconded whilst attending a post-graduate course abroad, 12th July, 1928.

The provisional appointment of Lieutenant F. G. Fenton is terminated, 31st July, 1928, and he is transferred to the Australian Army Medical Corps Reserve and to be Honorary Lieutenant, 1st August, 1928.

To be Captain—Lieutenant D. Zacharin, 14th August, 1928; Captain H. H. Stewart is brought on the authorized establishment, 27th August, 1928.

Australian Army Medical Corps Reserve.

To be Honorary Captains—Honorary Lieutenants M. J. Morris and E. B. Tunbridge, 1st July, 1928.

Major R. A. Robertson is transferred from the Australian Army Medical Corps, 2nd Military District, 1st July, 1928.

Honorary Captain W. Begg is retired, 30th July, 1928.

Captain A. E. Deravin is placed upon the Retired List with permission to retain his rank and wear the prescribed uniform, 27th August, 1928.

Fourth Military District.

Australian Army Medical Corps.

Captain (provisionally) D. M. Salter is brought on the authorized establishment, 1st July, 1928.

To be Captain—Lieutenant (Honorary Captain) A. R. Southwood, 15th June, 1920 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 1/1922, promulgated in *Commonwealth Gazette*, No. 3, of 12th January, 1922). The provisional appointments of Captains E. F. West, L. C. E. Lindon, L. D. Cowling, and N. S. Gunning are confirmed.

To be Major—Captain A. R. Southwood, 28th November, 1927.

Australian Army Medical Corps Reserve.

Captains O. R. Horwood and N. B. Hall are retired, 1st July, 1928.

Fifth Military District.

Australian Army Medical Corps.

Honorary Captain A. R. Home is appointed from the Australian Army Medical Corps Reserve and to be Captain (provisionally), 1st July, 1928. Major M. B. Johnson is transferred to the Australian Army Medical Corps Reserve, 1st July, 1928.

To be Captain (provisionally)—Hans Stubbe, 13th July, 1928. Captain D. I. R. Smith is transferred to the Australian Army Medical Corps Reserve, 4th July, 1928.

Australian Army Medical Corps Reserve.

To be Honorary Captain—Honorary Lieutenant T. W. Meagher, 1st July, 1928.

Lieutenant-Colonel A. J. H. Saw, O.B.E., is placed upon the Retired List with permission to retain his rank and wear the prescribed uniform, 16th July, 1928.

To be Honorary Captains—Eric David Thomas Smith and Malcolm Sylvester Bell, 1st July, 1928, and 24th July, 1928, respectively.—(Ex. Min. No. 176.)

Sixth Military District.

District Base: Staff.

Major C. N. Atkins, Australian Army Medical Corps, is re-appointed Assistant Director of Hygiene for a period of one year from 1st September, 1928.

Australian Army Medical Corps Reserve.

Captain F. Howson is retired, 1st July, 1928.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force: Medical Branch.

Appointment.—Edward Alfred Daley to a short service commission of four years on probation as Flight Lieutenant, 16th July, 1928.

Promotion.—Squadron Leader A. P. Lawrence, M.C., M.B., B.S., F.R.C.S. (Edin.), D.O.M.S. (Lon.), to Wing Commander, 1st July, 1927.—(Ex. Min. No. 151.)

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned have been registered under the provisions of Part I of the *Medical Act* 1915, of Victoria, as duly qualified medical practitioners:

Donaldson, Agnes, L.R.C.P. *et* S. (Edinburgh), L.R.F.P.S. (Glasgow), 1928, Windsor Crescent, Surrey Hills.

Jorgensen, Lily Agnes, M.R.C.S. (England), L.R.C.P. (London), 1927, Stanley Street, Brighton.

Klug, Cecil Conrad, M.B., B.S., 1928 (Univ. Melbourne), Ozone Hotel, Queenscliff.

QUEENSLAND.

THE undermentioned has been registered under the provisions of *The Medical Act of* 1925, of Queensland, as a duly qualified medical practitioner:

Smith, Charles Robert, M.B., Ch.M., 1920 (Univ. Sydney), Augathella.

Restoration to the Register:

Freshney, Reginald, M.B., 1892 (Univ. Sydney), Toowoomba.

Books Received.

THE NEW POCKET MEDICAL FORMULARY WITH AN APPENDIX, by William Edward Fitch, M.D.; Fifth Edition, Revised and Enlarged; 1928. Philadelphia: Crown 8vo., pp. 510. Price: $3.00 net.

BEDSIDE DIAGNOSIS, by American Authors: Edited by George Blumer, M.D.; in three volumes; 1928. Philadelphia: W. B. Saunders Company; Melbourne: James Little; Royal 8vo., pp. 2820, with illustrations. Price: £6 15s. net.

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION, Edited by Mrs. M. H. Mellish and H. Burton Logie, M.D.; Volume XIX; 1928. Philadelphia: W. B. Saunders Company; Melbourne: James Little. Royal 8vo., pp. 1330, with illustrations. Price: £3 net.

Diary for the Month.

SEPT. 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 26.—Victorian Branch, B.M.A.: Council.
SEPT. 27.—New South Wales Branch, B.M.A.: Election of Members to Federal Committee.
SEPT. 27.—South Australian Branch, B.M.A.: Branch.
SEPT. 28.—Queensland Branch, B.M.A.: Council.
SEPT. 29.—Eastern District Medical Association, New South Wales.
OCT. 2.—New South Wales Branch, B.M.A.: Council (Quarterly).
OCT. 2.—Tasmanian Branch, B.M.A.: Council.
OCT. 3.—Victorian Branch, B.M.A.: Branch.
OCT. 3.—Western Australian Branch, B.M.A.: Council.
OCT. 4.—South Australian Branch, B.M.A.: Council.
OCT. 5.—Queensland Branch, B.M.A.: Branch.
OCT. 5.—New South Wales Branch, B.M.A.: Delegates of Local Associations Meet Council (First Day).
OCT. 6.—New South Wales Branch, B.M.A.: Delegates of Local Associations Meet Council (Second Day).

Medical Appointments.

Dr. Alick Murray Will (B.M.A.) has been appointed a Member of the Boards of Official Visitors to the Mental Hospitals at Callan Park, Gladesville and Mount St. Margaret, Ryde, Sydney.

* * *

Dr. Vivian Roy Elphick (B.M.A.) has been appointed Government Medical Officer at Cargelligo, New South Wales.

* * *

Dr. Edmund Rupert Roseby (B.M.A.) has been appointed Government Medical Officer at Dorrigo, New South Wales.

* * *

Dr. Murray Menzies Vernon (B.M.A.) has been appointed Government Medical Officer at Inverell, New South Wales.

* * *

Dr. Keith Morison Garrett (B.M.A.) has been appointed Government Medical Officer at Muswellbrook, New South Wales.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

LAUNCESTON PUBLIC HOSPITAL: Junior Resident Medical Officer (Male).

TOOWOOMBA HOSPITALS BOARD: Resident Medical Officers.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. Marrickville United Friendly Societies' Dispensary. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to position at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. **The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.**